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CONTENTS

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The Sphere of the Dietitian C. P. Howard, M.D.

Concerning Standardization of Institutional Feeding Ruth Wheeler, Ph.D.

Carbohydrate Studies in Arthritis
Martha V. Nelson, M.S. and Julian D. Boyd, M.D.

Diabetic Diets for Children
Julian D. Boyd, M.D. and Martha V. Nelson, M.S.

Vegetable Purines in Gout
Ruth Wheeler, Ph.D. and Bessie I. Wallace, M.S.

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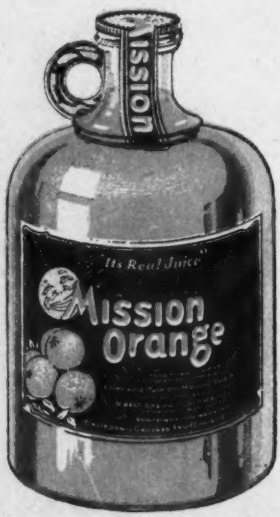

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Vol. 2, No. 1 JUNE, 1926

The Journal of

The American Dietetic Association

THE SPHERE OF THE DIETITIAN

C. P. HOWARD, M.D.[1]

Professor of Theory and Practice of Medicine, McGill University Montreal Canada; formerly State University of Iowa

When your Vice President, Dr. Ruth Wheeler asked me to address this meeting, I was on the point of refusing because I felt that I had nothing to say to experts about a subject in which I am not even a tyro. Upon second thought I realized that as I had been trying for the past few years to encourage young women in Iowa to take up the serious study of the important subject of Dietetics, this would be a golden opportunity to appear before some of the leaders of the dietetic profession and tell them why I have evinced an interest in this special field.

In the first place I had long since learned that the subject of dietetics was little, if at all, understood by the practitioner of medicine or even by the trained nurse. This was much to be regretted as recent investigation has opened up a large field in which the treatment of disease depended first and foremost upon the administration of a suitable and adequate diet. Gout and diabetes were the two classic examples which at first impressed the medical mind with the need of a better understanding of food values, to say nothing of the proper preparation of the various food materials. Before we had time even to begin to grapple with the problems offered by these two diseases we were suddenly distracted by a fresh realization that scurvy was largely, if not entirely due to an improper dietary. This in turn was shortly followed by an appreciation of the existence of quite a large group of what we now term "deficiency diseases." The vitamine question led to a regular crusade into the unexplored realms of medicine on the part of the bio-

[1] An address given at the meeting of the American Dietetic Association in Chicago, 1922. Published late because of a desire to have it with the studies he so generously encouraged.

chemist and dietitian armed with weights and measures instead of lance and battle-axe and with a knowledge of chemistry and cooking instead of a sword play and military tactics. While not admitting that we were entirely infidels, I regret to have to confess that we did not always receive you with the encouragement you deserved. However, times are changing and you have reason to be proud of your more recent reception.

During the last twenty years of the Nineteenth Century the hospital dietitian was the only variety of your species known. She was usually some graduate nurse who, because of some physical infirmity or some mental peculiarity, was unable to practice her profession of nursing, for which alone she had been trained. This dietitian-nurse gave a few lessons to the pupil nurses on cooking for the sick and convalescent and supervised the preparation of the trays for the private patients in the so-called "diet kitchen." She knew nothing of the chemistry of food or the physiology of digestion.

With the introduction of chemical investigation of disease during the first decade of the Twentieth Century, the development of a more scientific attitude on the part of the dietitian was essential. While much credit must be given to the chemists and physiologists both in the United States and Europe for the training and inspiration of the earlier dietitian, we must also frankly recognize the inestimable stimulus the subject of dietetics has received from the various departments of Home Economics of our colleges and State Universities. It soon became evident, however, that the mere theoretical lecture and laboratory period afforded by such courses were not sufficient for the proper development of the dietitian. Further while the laboratory animals,—the white rat and guinea pig—were excellent media to study primary food reactions, they did not offer the complexities of the human problem. It seemed perfectly clear, therefore, to myself and to Miss Ruth Wardall (who was then head of the Department of Home Economics at the State University of Iowa) that the hospital was the proper place for the student of dietetics to complete her course of study, just as it is for the medical student. Accordingly, Miss Wardall first appointed one of her staff, Miss Margaret Sawyer to act as the link between her department and the chemical research laboratory of the medical clinic which was then under the direction of Dr. Louis Baumann. Together they planned out a practical laboratory course on physiological chemical methods and offered it to senior students of the Home Economics Department. Only two or three registered each year, but they were fortunately rather superior women and good material for a new course. Some of them subsequently

accepted positions as hospital dietitians. In those days a thorough knowledge of organic and physiological chemistry, a smattering of physiology and bacteriology were the only requirements. Further, they worked only with a small group of cases as diabetes, nephritis, various types of acidosis, anaemia, the muscular dystrophies, etc. They were, as a matter of fact, special students working under direction upon special research problems. We were preparing skilled technicians and nothing more, though it is true we were stimulating a spirit of research. About this time the senior medical students petitioned the medical faculty for a course in dietetics. This was just what we wanted. Miss Wardall and I were then in a good position to apply to the University authorities for a department of dietetics for the hospital and medical school. President Jessup and our Dean, Dr. L. W. Dean, saw the need and asked for nominations. Dr. Ruth Wheeler was offered the chair and after some hesitation accepted it. We will shortly be in a position, I believe, to give a fundamental training to our medical student and nurses in the principles and practice of dietetics.

Of course we have not yet the necessary space or the appropriate equipment, but we have made a beginning and I feel the future is very bright. One thing is certain we have a splendid spirit of coöperation between the medical faculty, nurses training school, medical superintendent and the department of dietetics which I take it is a sine qua non for the success of such a venture.

While admitting that the proper feeding of the patients and staff of the University Hospital must be the first duty of this department and that next to this comes the routine instruction of the undergraduate medical student and nurse, we feel it has a more stimulating function, namely the intensive training of young women who intend to specialize in the field of dietetics.

Just a word about the training of such special students: Whether she be a student of medicine or home economics she must have a thorough grounding in organic and physiological chemistry, human physiology and general bacteriology before she may register for her course. She should then take the usual courses offered in the home economics department and in her clinical year divide her time between the general hospital kitchen, special diet kitchen, metabolism wards and milk and chemical laboratories of the hospital. She must not neglect the surveying or purchasing department nor the general executive side of the dietitian's office.

In passing let me warn the members of this association that the hospital

dietitian, if she is to occupy the position so gloriously pictured a year or two ago by some of your members, must have had considerable training and practical experience in executive work of a hospital. She will have to work with, if not directly under the control of the medical superintendent whose great aim is the economy of the hospital. As the greatest liability in a hospital budget is the one for food, it is no small wonder that her expenditures will be watched with a cold and scrutinizing eye. She must balance calorie and cent, food-intake and monetary-output with rare discretion. She must not forget that California cherries are more expensive than the old fashioned prune or that spring chicken is a luxury and Irish stew is always in season. Further, she must use common sense as well as scientific knowledge in the filling of her dietetic prescription. Not so very long ago in a certain hospital an enthusiastic dietitian was making official rounds with the medical superintendent. They came to to an orthopedic childrens ward just at dinner time. The dietitian, with great gusto, informed the awed medical man that the diets for such a group had certain requirements in calories and must be nicely adjusted as to fat, protein and carbohydrate. All of this was no doubt true. However, much to the superintendent's horror (I almost said amusement) each child was provided with a glass of milk, two large slices of white bread, a pat of butter, some meat with mashed potatoes and gravy and on the same tray two generous slices of ginger bread! The poor woman had forgotten that she was once a child and had preferred cake to bread and butter and even to mashed potatoes and gravy! How much of the proteins and fats would these children have taken from that theoretically well balanced meal? I maintain that it is as much the duty of the dietitian to finish her task and see that the calories are served not only hot, but in a manner that will guarantee their consumption, just as much as it is the responsibility of the physician to see that his prescription which has been filled by the pharmacist (our cook if you please) be given by the nurse in the proper way and at the right time.

The graduate dietitian, as I would like to see her, has several functions: she must stimulate, if not herself carry on research in nutrition; she must render available to the hospital staff her expert knowledge; she must instruct and educate the student of medicine and the pupil nurse, and lastly, she must administer in the most efficient and most economical manner her department, remembering that she is not a unit in herself but merely a cog in a great machine. Her first two functions are understood better by you than by me. But the executive side is beset by many pitfalls and snares. She will require great tact to avoid running

foul of the superintendent of the training school and her corps of instructors, due in part to her identity of sex and in part to the fact that she has only recently escaped from the discipline of the training school of nurses. With the medical superintendent she will have many a pitched battle unless she shows herself a good organizer, a rigid economist and a strict disciplinarian. With the medical staff she will be treated as an equal only if she admits at once that she is an expert merely in dietetics and that her knowledge of diagnosis is absolutely nil. She should be willing to confess that her therapeutic value is only a dietetic one and *possibly* of no greater importance than that provided by the hydrotherapeutic department with its baths, massage and electricity, or than that of the actinographic laboratory with its X-ray and radium or than that of the pharmaceutical dispensary with its drugs, vaccines and glandular extracts. We are such faddists by nature that each specialist is so apt to ride his hobby-horse to its own destruction.

Even when the dietitian enters the research field she should be content to deal at first only with the physiological problems and to avoid scrupulously the pathological ones. Quite recently one of the leading physiological chemists, when investigating one of the deficiency diseases made himself ridiculous in the eyes of the medical profession by venturing to explain the pathogenesis of the disease in man from his own personal observation upon the condition of the laboratory animal in which the disease had been experimentally produced. "Cobbler keep to your last" is a safe word of advice to offer you at the close of these rambling remarks.

STANDARDIZATION OF INSTITUTIONAL FEEDING

Importance; Methods; Factors Involved

RUTH WHEELER

To some people the word standardization when used in connection with meals suggests monotony and inflexibility, beef served on Mondays, ham on Tuesdays, or some similar rotation of staple dishes, but a carefully planned outline may provide a better means of avoiding monotony than trust in daily inspiration can do, and secure at the same time the certain inclusion of nutritive essentials. Standardization may take the form of a large number of different adequate menus which can be used in irregular rotation or it may be a skeleton built to ensure as far as anything mechanical can do so compliance with the nutritive and economic standard which has been set for the special conditions involved. In either case there will be more time to consider variety in method of preparation and service, and of course if inspiration should come it can still be used. The outline need not be considered a substitute for thought, but rather a scaffold on which thought may build.

During the last three years various studies have been made in the University Hospitals at the State University of Iowa, with the encouragement of the superintendent, looking towards a satisfactory standardization; economic and nutritive analyses of food bills, and studies of waste. In an institution as in a family a good working plan and a good budget mean freedom and peace of mind, with greater chance for progress. In either an institution or a family the evolution of a good working plan or a budget requires all the ability, experience and knowledge that can be contributed by all the people most concerned. In the family the member who buys the food or plans the meals or does both can contribute what no one else could furnish; suggestions of food combinations that appeal to the appetities of the particular group concerned, that can be handled by the kitchen equipment and the kitchen personnel and that will furnish nutritive essentials. Any intelligent person can be more useful if his whole intelligence is allowed to help, and not just his ability to follow directions. In families, "new women" can doubtless be found stubbornly insisting on following their own economic or uneconomic plan

without making use of the possibly greater business ability or experience of the men of the family; survivals of the cave man still, doubtless impose their idea of a budget on the women of their families. But in some real family partnerships each member certainly runs his own job and at the same time makes use of all the contributions that the others can make. In some institutions similar real coöperation is beginning to obtain. The total amount of money available is often fixed outside the institution and the gross distribution must be determined by the chief administrative officer. Detailed distribution is best worked out in coöperation and flexibility will be found to be wise economically. Some people especially in institutions depend upon food not only for fuel and repair material and juice for the batteries, but for a part of their wages and for the chief entertainment of their day. There is no other waste so sinful as the waste of energy that always accompanies dissension; and much of the unhappiness of life in institutions comes from the feeling about the food. Although no amount of flexibility will do away with dissatisfaction about food, and difficulties cannot be obviated by the adjustment of one contributing factor, food seems to be one factor that makes a difference out of all reasonable proportion to its admitted importance. Consideration of two typical flat rules illustrates the way that a policy of unnecessary inflexibility works out.

1. Foods shall never be served out of season, say some authorities. On the surface this rule sounds reasonable, even necessary, if the person planning meals cannot be trusted to use good judgment. But one single spring strawberry on a tray will with its promise of summer often charm a patient long sick and tired of trays into eating a whole meal. If the cost of that strawberry can be saved by using on that day a cheaper cereal or a cheaper vegetable than would generally be chosen, why should a hospital board member object? "If you can use a cheaper cereal, why not use it every day?" Few boards need or want to use only the very cheapest foods every day. The real aim of boards and of the other people concerned in hospital feeding is not to give a demonstration of the lowest cost at which people can be kept alive, but to keep the patients as happy as possible, and to make them well as soon as possible, at the lowest cost compatible with nutritive adequacy or the most generous allowance available.

2. Serve cereal twice daily, the powers command. There are serious nutritive objections to too much starch, but this rule can be followed without violation of any nutritive canon. In some types of diet, in some conditions, on a low cost level, it may be a good rule; but if it is

inflexible, it is a manacle. If occasionally a substitute can be used which is equivalent nutritively and economically, if altogether different food combinations can be used occasionally, the psychological advantage is out of all proportion to the slightly increased cost. Most patients stay for only short times in hospitals, but they return, and their relatives and neighbors come. The hospital may come to have a reputation for serving poor food just because it has a collection of inflexible rules (perhaps from tradition, perhaps a source so august that it can never be questioned, perhaps from mental laziness or lack of ideas in the person who plans the meals) which could just as well be replaced by a budget, with no loss of money, labor, or efficiency.

The rules as rules go are not bad in themselves; it is primarily their invariable enforcement, without regard to special circumstances, that may make trouble.

Dietitians who prove that they have as much interest and as much skill in handling the economics of the situation as any other phase of it are likely to gain gradually increasing authorization to adjust details within the limits set by a general policy. They can then work out a diet system which can be depended upon to furnish all the nutritive essentials and to be economically right for the institution in question. With this foundation or scaffold, more time can be found in the day to work out new food combinations, new and better ways of cooking and serving and available foods, so lamentably few at best, and so perhaps lessen the all but unavoidable dullness of institutional meals.

Each dietitian will make her own skeleton or scheme, suited to her own institution and its community and will change it from time to time, but certain facts and groups of facts she must *know:* (1) The nutritive requirements for children and for adults in health and disease. (2) The relative value of available foods as sources of nutrients. (3) The relative cost of the various sources of each nutrient. As to nutritive requirements, the dietitian should have not only a knowledge of figures but also a clear idea of the value of those figures. Are they all equally authoritative, those constantly used standards for protein, calcium, phosphorus, iron, energy? On what sort of studies is each of them based? Are they actual determinations, or estimates, or a combination? One needs to go back now and then and to read critically reports of the original studies whose conclusions have come to be used so confidently and mechanically. One needs also to read critically summaries and digests of such studies now and then.

The factors involved, then in the standardization of the General Diet, are NUTRITIVE REQUIREMENTS (the essential amounts of protein, minerals, vitamines and energy); the SOURCES of these essentials; the RELATIVE COST of the foods which may serve as sources of these necessary food constituents (including the consideration of cost in relation to nutritive value, of seasonal variation, and geographic modification); the MATTERS OTHER THAN NUTRITIVE which will effect the successful feeding of people; and the MINIMUM COST on which adequate diet can be planned and served (including the minimum cost of *raw food*, the *relation* of raw food costs to total cost of food as served, the *economical significance of variety* in food and in its preparation and service, the *cost of service*, the number of meals served per dollar paid in wages, the *cost of skill* and ingenuity of cooks, the *standardization* of equipment and of number of types of meals served, and study and *avoidance of dangers* of using absolute minimum requirement).

A NUTRITIVE ANALYSIS OF HOSPITAL FOOD BILLS

RUTH WHEELER AND EDNA SHALLA[1]

It is important that hospitals take every practicable means of insuring nutritive adequacy in the food provided for patients. When standardization is satisfactorily worked out, it may be possible to prove the sufficiency of the diets by checking the menus with the skeleton plan; at present it is necessary to examine the details with a good deal of care. It is so fatally easy to get into a rut. Occasional analyses of monthly food bills, of plate waste on a ward, of kitchen waste, of food actually eaten by individual patients, all make for real progress. Within reasonable limits, such studies should be not only allowed to student dietitians, but expected of them. In teaching hospitals connected with universities where the period of training is sufficiently long to permit any serious study of university calibre, various sorts of economic and administrative studies desired by the superintendent, and case studies of patients or groups of patients on therapeutic diets desired by the doctors will prove useful to the hospitals and to the students who make them. It is an incidental matter that such studies are also graduate work or even research. Such work is an essential routine part of the job of a university hospital, but only such studies as the hospital needs to have made have any place in a hospital department. The State University of Iowa has been a pioneer in several lines. Its medical college has established the first department of nutrition which is an integral part of its own organization. Since its establishment in the summer of 1921 there have been in the hospital three superintendents, all generously interested in every means of real progress in food administration. Both Doctor Lomas and Doctor Caldwell approved the undertaking of these studies; Doctor McElroy has kindly read and approved the report as offered for publication; it is a pleasure to express our obligation and gratitude to them.

The present paper reports a study of the nutritive value of food purchased in the main University Hospital during four typical months in 1924–25. Total amounts of food purchased during each month were

[1] The data in this paper are taken from the master's thesis of Edna Shalla, now children's dietitian, General University Hospital, State University of Iowa, Iowa City.

expressed in a common unit—pounds. As only nutritive value was under consideration, such articles as coffee, condiments and flavors were disregarded. Inedible refuse was subtracted from the total amount of each food purchased. Table 1 shows the total amount of edible portion of each food with its usual percentage of refuse as given in Agricultural Bulletin number 28 and as found in studies made in this University by Elizabeth J. Magers,[2] research dietitian in this department in 1924–25.

Calculations were made by the plan elaborated by A. R. Rose[3], from Caroline Hunt's[4] scheme for computing the nutritive value of large quantities of food.

Briefly Rose's plan is as follows:

1. Foods are used in seven *classes*
   Cereals and cereal products
   Legumes and shelled nuts
   Vegetables and fruits
   Sugars and starches
   Fats and oils
   Foods rich in fat and protein
   Animal foods, exclusive of whole milk and fat
2. Each class is further divided into *groups* on the basis of its percentage of protein, fat and carbohydrate

Method of determining factors:

1. One group from each class is arbitrarily chosen as a standard and called *one*.
2. With this standard as a basis, a weight adjusting factor is determined for all other groups of the same class. For example,
   a. In Class I, cereals and cereal products, for group one, wheat and wheat products are chosen as the standard for total calories, protein calories and fat calories, and its factor for each of these is called *one*. Oatmeal, also in Class I, but in a group of its own, has a higher percentage of energy than wheat (100 grams of oatmeal being equivalent in terms of energy to 110 grams of wheat). Therefore if the weight of the oatmeal bought is multiplied by 1.1, this adjusted weight can be added to the pounds of wheat products purchased and the same "factor for calories"

[2] E. J. Magers: Crude fiber in food. Jour. Amer. Diet. Assoc., i, 73, 1925.

[3] A. R. Rose: Abridged dietary calculations for rations in quantity. Mod. Hosp., xiv, 487, 1920.

[4] C. Hunt: Method of dietary calculations for rations in quantity. Jour. Home Econ., x, 212, 1918.

TABLE 1

Analysis of monthly food bills—edible portion of food

FOOD	S.U.I. HOSPITAL				CHILDREN'S HOSPITAL
	April, 1924	July, 1924	October, 1924	January, 1925	March, 1925
	E.P.	E.P.	E.P.	E.P.	E.P.
	pounds	*pounds*	*pounds*	*pounds*	*pounds*
Cereals:					
Bran	1	.....	.....	.....	10
Bran flakes	.....	3.7	3.7	.....	.....
Cornflakes	147.5	58.5	206.5	175.5	58.5
Cream of wheat	76.5	153	114.7	114.7	36
Farina	.....	.....	108.7	87	.....
Grapenuts	.....	.....	18	18	36
Krumbles	.....	.....	12	.....	.....
Malt	165	132	132	132	33
Oatmeal	247.5	165	123.7	82.5	123.7
Ralstons	72	90	108	36	54
Pettijohns	162	135	108	81	27
Puffed rice	.....	11	.....	.....	.....
Puffed wheat	.....	18	.....	.....	18
Wheatena	99	99	49.5	99	.....
Barley	.....	.....	10	25	.....
Cornstarch	320	292	210	175	
Marcaroni	60	140	60	60	120
Spaghetti	60	100	20	40	.....
Tapioca	.....	.....	15	100	.....
Rice	120	120	20	100	80
Noodles	.....	50	30	40	.....

Flour:					
White	1,100	1,200	1,200	1,000	450
Barley	.....	10	.....	.....	.....
Buckwheat	30	.....	.....	.....	.....
Cornmeal	100	40	30	25	50
Graham	10	.....	.....	.....	.....
Crackers:					
Graham	94	41	61.5	61.5	.....
Soda	658	434	581	693	454.5
Bread:					
White	5,050	5,930	9,670	4,890	1,160
Graham	1,110	1,200	160	1,283	247.5
Raisin	375	795	480	555	.....
Rye	405	.....	.....	.....	.....
Whole wheat	.....	.....	.....	.....	1,192.5
Rolls	198.7	303.7	417.5	247.5	101
Cookies	31.5	37	21	16.8	.....
Staples:					
Butter	1,710	1,599	2,129	1,836	830
Oleomargarine	270	300	450	240	.....
Lard	.....	8	.....	.....	120
White cloud	240	420	420	460	.....
Mazola oil	240	214	240	180	12
Sugar—brown	115	25	50	50	.....
Sugar—powdered	85	25	75	50	1090
Sugar—white	3,400	4,100	4,400	3,900	.....
Honey	50	300	.....	.....	.....
Jelly	70	100	210	237	.....
Molasses	24	24	49	24	.....
Candy	40.5	65	103	108	5

TABLE 1—*Continued*

FOOD	S.U.I. HOSPITAL				CHILDREN'S HOSPITAL
	April, 1924	July, 1924	October, 1924	January, 1925	March, 1925
	E.P.	E.P.	E.P.	E.P.	E.P.
	pounds	*pounds*	*pounds*	*pounds*	*pounds*
Dairy products:					
Buttermilk	196	144	8	8	.....
Skim milk	6,800	4,720	6,944	5,640	.....
Whole milk	41,428	26,621.5	32,976	31,545	2,465
Cream, 20 per cent	480	465	616	604	124
Cream, 40 per cent	61	70	6	6	2
Ice cream	2,944	.....	428	598	832
Vegetables—canned:					
Asparagus	159	973.8	238.5	119	.....
Kidney beans	602	682	602	883	321
Lime beans	30	15	15	.....	180
String beans	702	936	897	858	457.5
Beets	954	595	39.7	636	159
Corn	810	.....	1,140	915	180
Hominy	270	292.5	45	.....	.....
Peas	1,170	1,050	1,200	900	570
Potatoes—sweet	56	.....	.....	.....	.....
Pumpkin	57.5	.....	.....	.....	.....
Sauerkraut	.....	.....	37.5	.....	.....
Spinach	667.5	1,012.5	1,012.5	937.5	363
Tomatoes	1,235	1,873	1,593.3	1,513.6	1,172.3

Legumes—dried:					
Lima beans	90	300	210	200	40
Navy beans	100	.....	100	.....	20
Fruits—canned:					
Apples	1,244	1,244	144	1,080	.....
Apricots	507	195	78	78	195
Cherries—red	37.5	187.5	150	243.7	150
Cherries—white	156	39	.....	96.5	117
Peaches	1,404	702	624	429	234
Pears	507	546	234	195	312
Pineapple	108	306	252	180	144
Plums	.....	.....	.....	.....	187.5
Raspberries	19.8	57.5	.....	39.7	.....
Strawberries	30	.....	15	.....	.....
Rhubarb	.....	.....	695	.....	111.7
Miscellaneous:					
Cocoa	.....	.....	120	60	5

TABLE 1—*Continued*

FOOD	S.U.I. HOSPITAL								CHILDREN'S HOSPITAL		REFUSE
	April, 1924		July, 1924		October, 1924		January, 1925		March, 1925		
	A.P.	E.P.	A.P.	E.P.	A.P.	E.P.	A.P.	E.P.	A.P.	E.P.	
	pounds	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*	*per cent*
Vegetables—fresh:											
Beets	.....	.....	156	125	1,335	968	105	84	.....	.....	20.0
Carrots	1,012.5	728	1,500	1,079	1,500	1,079	1,000	819	545	393	28.1*
String beans	.....	.....	48	44.6	12	4	.....	.....	.....	.....	7.0
Celery	252	202	301	241	683	546	497	397.6	217	174	20.0
Lettuce	766.5	483	1,165.5	743	686.5	432.5	746	470	309	195	37.0*
Onions	270.6	219	444.6	360	983	796.4	669.6	542.4	171	138.5	19.0*
Cucumbers	.....	.....	97	82.5	43	36.5	.....	.....	.....	.....	15.0
Peas	.....	.....	50	27.5	.....	.....	.....	.....	.....	.....	45.0
Cabbage	940	766	1,135	925	929	757	535	436	350	285	18.5*
Turnips	55	38.5	90	63	935	654.5	126	88	175.5	122.5	30.0*
Cauliflower	.....	18	.....	6	.....	21	.....	66	.....	.....	.....
Tomatoes	.....	14	.....	278.6	.....	90	.....	.....	.....	.....	.....
Green peppers	.....	10.5	.....	7.5	.....	21	.....	9.7	.....	1.5	.....
Radishes	21	14.7	2	1.5	.....	.....	.....	.....	.....	.....	30.0
Potatoes—white	19,680	16,767	19,920	16,961.8	22,200	18,914.4	16,500	14,058	5,640	4,805	14.8*
Potatoes—sweet	.....	.....	.....	.....	962.5	770	1,375	1,100	.....	.....	20.0
Pumpkin	.....	.....	.....	.....	200	100	.....	.....	.....	.....	50.0
Parsnips	25	17	.....	.....	.....	.....	85	57	100	69.5	32.5*
Rutabagas	650	503	.....	.....	.....	.....	625	483.7	75	58	22.6*
Squash	.....	.....	.....	.....	730	365	.....	.....	.....	.....	50.0
Spinach	.....	.....	.....	.....	.....	160	.....	.....	.....	.....	
Total pounds fresh vegetables bought, excluding potatoes	4,035	3,015	5,025	3,978	8,329	6,031	4,465	3,454	1,944	1,439	.....
Total pounds used uncooked	2,004	1,491	2,987	2,272	2,444	1,883	1,788	1,304	878	656	.....
Total pounds potatoes	19,680	16,823	19,920	16,962	23,162.5	19,684	17,875	15,158	5,640	4,805	.....

uncooked	2,004	1,491	2,987	2,272	2,444	1,883	1,788	1,304	878	656	.....
Total pounds potatoes	19,680	16,823	19,920	16,962	23,162.5	19,684	17,875	15,158	5,640	4,805	.....
Fruits—fresh:											
Apples	625	543	225	195	200	174	825	717	690	600	13.1*
Oranges	5,544	3,249	5,985	3,507	6,111	3,581	6,867	4,024	2,299.5	1,347.5	41.4*
Lemons	648	454	975	682	600	420	675	472	77	54	30.0
Grapefruit	928	464	864	432	448	224	736	368	44	22	50.0
Rhubarb	41	25	22	13	.....	.....	.....	.....	.....	.....	40.0
Canteloupe	.....	.....	125	63	54	27	.....	.....	.....	.....	50.0
Bananas	476.6	268	1,210	680	935	525	1,045	537	117.5	66	43.8*
Pineapple	.....	.....	.....	12	.....	.....	.....	.....	.....	.....	.....
Watermelon	.....	.....	.....	.....	280	114	.....	.....	.....	.....	59.4
Cherries	.....	.....	180	171	.....	.....	.....	.....	.....	.....	5.0
Raspberries	.....	.....	.....	300	.....	.....	.....	.....	.....	.....	.....
Peaches	.....	.....	72.5	60	75	62	.....	.....	.....	.....	18.0
Pears	.....	.....	.....	.....	87	78.3	.....	.....	.....	.....	10.0
Grapes	.....	.....	.....	.....	155	116.3	.....	.....	.....	.....	25.0
Strawberries	.....	.....	22	21	.....	.....	.....	.....	.....	.....	5.0
Total pounds fresh fruit bought	8,263	5,003	9,993	6,136	8,945	5,321	10,148	6,118	3,228	2,090	.....
Total pounds used uncooked	7,597	4,435	9,584	5,928	8,745	5,147	9,320	5,401	2,538	1,490	.....
Fruits—dried:											
Prunes	850	680	700	560	375	300	450	360	200	160	20.0*
Apricots	.....	425	.....	200	.....	325	.....	200	.....	125	.....
Peaches	.....	350	.....	300	.....	275	.....	475	.....	.....	.....
Dates	36	33	3	2.7	43	39	32	29	10	9	10.0
Figs	.....	.....	.....	15.4	.....	6	.....	.....	.....	30	.....
Raisins	25	22.5	55	50	.....	.....	60	54	.....	.....	10.0

TABLE 1—*Continued*

FOOD	S.U.I. HOSPITAL								CHILDREN'S HOSPITAL		REFUSE
	April, 1924		July, 1924		October, 1924		January, 1925		March 1925		
	A.P.	E.P.	A.P.	E.P.	A.P.	E.P.	A.P.	E.P.	A.P.	E.P.	
	pounds	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*	*per cent*
Meat:											
Beef	4,135	1,034	4,900	1,225	4,649	1,162	4,090	1,022.5	1,377	1,033	25.0*
Soup bones	290	.....	570	.....	500	.....	620	.....	220	.....	.....
Mutton and lamb	91	75	76	71	95	79	123.5	103	.....	.....	17.0†
Pork	2,611.5	2,194	1,661	1,395	1,858	1,561	2,463.5	2,070	519.5	437	16.0†
Veal	828	712	43	37	26	23	47	40	236	203	14.0†
Liver	99.5	92	79.5	94	48	44	18.5	17	116.5	108	7.3
Hens	1,596	1,183	1,294	959	1,258	932	287	213	6	4.5	25.9
Bacon	500	460	700	644	650	598	350	322	150	138	8.0†
Ham	276.5	247	198	176	126	122	65.5	59	69	61	11.0†
Corned beef	.....	.....	.....	.....	.....	.....	.....	15	.....	40	.....
Dried beef	.....	54	.....	.....	.....	132	.....	84	.....	48	.....
Frankfurters	.....	.....	.....	.....	.....	.....	.....	.....	.....	50	.....
Fish:											
Whitefish	890.5	405	.....	.....	727	338	688	320	.....	.....	53.5
Salmon	.....	.....	411	330	190	134	223	157	187	131	29.5
Trout	.....	.....	434	224	.....	.....	.....	.....	.....	.....	48.5
Oysters	.....	81	.....	.....	.....	130	.....	45.5	.....	.....	.....
Canned salmon	144	124	36	31	.....	.....	48	41	100	86	14.2
Canned shrimp	.....	.....	.....	34.5	.....	.....	.....	.....	.....	.....	.....
Canned codfish	.....	.....	.....	.....	.....	.....	30	28.5	.....	.....	1.6
Canned tuna fish	.....	.....	.....	.....	.....	10.5	.....	10.5	.....	.....	.....
Eggs	3,690	3,277	4,140	3,696	4,590	4,076	3,027	2,991	1,620	1,439	11.2

Eggs	3,690	3,277	4,140	3,696	4,590	4,076	3,027	2,991	1,620	1,439	11.2
Cheese:											
Cottage cheese	.....	26.5	.....	16	.....	13	.....	10.7	.....	44	.....
Cheese	.....	472.5	.....	445.5	.....	459	.....	310.5	.....	496	.....
Gelatin	.....	.....	.....	137	.....	40	.....	57.5	.....	.....	.....
Cocoanut	.....	5	.....	25	.....	.....	.....	17	.....	.....	.....
Nuts	.....	91	.....	76	.....	57	.....	75	.....	12.5	.....

Sources of refuse figures: Bulletin 28 unless indicated.

* Local determinations.

† Rose Laboratory Manual for Dietetics."

TABLE 2

Analysis of total nutritive value of food from monthly bills, S. U. I. Hospital

January, 1925

GROUP	AMOUNT BOUGHT (EDIBLE PORTION)	GROUP FACTORS FOR			ADJUSTED WEIGHT FOR			CLASS FACTORS FOR			TOTAL VALUES			
		Calories	Fat calories	Protein, calories	Calories	Fat, calories	Protein, calories	Calories	Fat, calories	Protein, calories	Calories	Fat, calories	Protein, calories	Protein, grams
	pounds													
I. Cereals and cereal products:														
1. Wheat and wheat products...	1,893	1.0	1.0	1.0	1,893	1,893	1,893							
2. Rice and rye.....	100	1.0	0.3	0.7	100	30	70							
3. Corn, meal and flour, hominy, barley, cornflakes, buckwheat.....	225	1.0	1.4	0.7	225	315	158							
4. Oatmeal.....	83	1.1	7.0	1.4	91	578	116							
5. Bread.....	6,976	0.7	1.3	0.8	4,883	10,643	5,580							
6. Bakery products:														
a. Crackers.....	755	1.1	8.0	0.9	830	6,036	679							
b. Cookies.....	17	1.0	11.0	0.6	17	185	10							
Totals—group.....	10,049				8,039	19,500	8,506	1,620	40	210	13,023,180	780,000	1,786,260	446,565
II. Dry legumes and shelled nuts:														
1. Beans, peas, lentils.....	200	1.0	1.0	1.0	200	200	200							
2. Shelled nuts.....	75	1.7	30.0	0.9	128	2,250	68							
Totals—group.....	275				328	2,450	268	1,580	70	400	518,240	171,500	107,200	26,800

III. Vegetables and fruits:														
1. a. White potatoes	14,058	1.0	....	1.0	14,058	.....	14,058							
b. Sweet potatoes	1,100	1.5	....	1.0	1,650	.....	1,100							
2. Roots (fresh and canned)	2,168	0.5	....	0.6	1,084	.....	1,301							
3. Stem and leaf types (fresh and canned including onion	4,493	0.4	....	0.6	1,797	.....	2,696							
4. Green vegetables in pod and seed (including canned goods)	3,556	0.8	....	1.5	2,845	.....	5,334							
5. Fruit served as vegetable (i.e., squash)	.....	0.3	....	0.6	.....	.....	.....							
6. Sweet fruits:														
a. Fresh	6,118	0.8	....	0.5	4,894	.....	3,059							
b. Canned	2,342	1.3	....	0.5	3,045	.....	1,171							
c. Dried	1,118	4.4	....	2.2	4,919	.....	2,460							
Totals—group	34,953				34,292	.....	31,179	300	.....	30	10,287,600	.....	935,370	233,843
IV. Sugars, syrups, starches:														
1. Sugar, candy, starch	4,483	1.0	.....	.....	4,483	.....	.....							
2. Syrups, jellies	261	0.75	.....	.....	196	.....	.....							
Totals—group	4,744				4,679			1,800	.....	....	8,422,200	.....	.....	.....
V. Fats and oils:														
1. Lard, butter, vegetable oils	2,716	1.0	1.0	....	2,716	2,716	.....							
2. Bacon	350	0.7	0.7	....	245	245	.....							
Totals—group	3,066				2,961	2,961		3,500	3,500	....	10,363,500	10,363,500	.....	.....

TABLE 2—*Continued*

GROUP	AMOUNT BOUGHT (EDIBLE PORTION)	GROUP FACTORS FOR			ADJUSTED WEIGHT FOR			CLASS FACTORS FOR			TOTAL VALUES			
		Calories	Fat, calories	Protein, calories	Calories	Fat, calories	Protein, calories	Calories	Fat, calories	Protein, calories	Calories	Fat, calories	Protein, calories	Protein, grams
	pounds													
VI. Foods rich in fat and protein:														
1. Milk, fresh—whole	31,545	1.0	1.0	1.0	31,545	31,545	31,545							
2. Cocoa, chocolate	60	7.5	7.5	6.5	450	450	390							
3. a. Gravity cream	6	2.7	4.5	0.7	16	27	4							
b. Ice cream	598	1.6	0.5	1.0	957	299	598							
Totals—group	32,209				32,968	32,321	32,537	315	160	60	10,384,920	5,171,360	1,952,220	488,055
VII. Animal products, exclusive of whole milk and fats:														
1. Beef, veal liver	1,164	1.0	1.0	1.0	1,164	1,164	1,164							
2. Ham, pork	2,129	2.2	2.8	1.3	4,674	5,961	2,768							
3. Mutton, lamb, corned beef	118	2.0	2.2	1.3	236	260	153							
4. Fowl	213	1.0	1.0	1.0	213	213	213							
5. Fresh fish, entrails removed	487	0.5	0.3	0.7	244	146	341							
6. Preserved fish	80	1.0	1.1	1.4	80	88	112							
7. Shell fish	46	0.3	....	0.3	14	.....	14							
8. Eggs	2,991	1.0	1.0	0.6	2,991	2,991	1,795							
9. Cheese	321	3.0	3.0	1.7	964	964	546							
10. Milk, skim	5,648	0.3	....	0.25	1,694	.....	1,412							
Totals—group	13,197				12,274	11,787	8,518	600	350	300	7,364,400	4,125,450	2,555,400	638,850
Totals—class	98,493										60,364,040	20,611,810	7,336,450	1,834,113

used in calculating the energy value of the whole class. In this case, 1.1 is the weight adjusting factor for total calories. Such a factor is determined in the same way for the remaining groups of food.

b. A weight adjusting factor for total protein calories is determined in the same way, the adjusted weight of the oatmeal being 40 per cent more than the original weight, with a resulting factor of 1.4. In the same way, a weight adjusting factor is determined for fat calories for each group.

Calculation of nutritive value of food purchased

1. Pounds of edible portion of foods in each group were adjusted for weight according to the factors just determined.
2. Adjusted weights were used to calculate total calories, protein calories and fat calories respectively in each class. (Table 2 *group totals* under adjusted weight.)
3. A type class factor for total calories, protein calories and fat calories has been determined for each of the seven classes of foods.
4. Total pounds adjusted weight for each class were multiplied by the type class factor for that class for total calories, total protein calories, and total fat calories. (Table 2 under *Total values*)
5. The sum of the total calories, protein calories and fat calories respectively, of the seven classes gives total calories, protein calories and fat calories of the whole ration. Protein grams are easily determined by division of total protein grams by four. Carbohydrate calories and grams are found by difference. Nutritive totals of the entire food supply for the four months at the main University Hospital and for one month at the Children's Hospital are to be found in table 2, Class totals under Total Values.

Constancy in the total amount of food constituents furnished each month is noticeable from the nutritive analysis of monthly bills, table 2, and indicates some degree of standardization. A variation in the total census from 602 to 731 persons daily explains the difference in amount of foods purchased. Total pounds of fresh vegetables and fruits as shown in table 1 vary chiefly according to the season of the year, vegetables however showing the greatest variation. Fruits vary less, as each patient is allowed an orange daily as a source of vitamins B and C.

The percentage distribution of total protein, fat and energy among the various classes of foods as calculated by this method is shown in table 3. During the four months approximately one-half to seven-tenths of the total protein was furnished by milk, meat, eggs and fish; one-fifth by

cereals; and one-fifth by vegetables and fruits. A larger proportion of food from cereals would tend to decrease cost but would be of doubtful wisdom nutritively for sick people. In this hospital, more than fifty per cent of the total protein each month was furnished by animal foods.

In interpreting per capita allowance of food constituents indicated in table 4 it is necessary to remember that waste is not considered in this calculation. The variability in the appetites of sick people from day to day and from meal to meal, their ignorance of food values and the necessity of furnishing adequate amount of food on the tray are responsible for waste which cannot be entirely remedied. Edible plate waste in this hospital has not yet been definitely determined, but assuming the

TABLE 3

Nutritive value of food purchased

Daily grams per capita of food constituents computed from monthly bills

	S.U.I. HOSPITAL				CHILDREN'S HOSPITAL
	April, 1924	July, 1924	October, 1924	January, 1925	March, 1925
Census (persons per day)	731	602	661	645	274
Calories	3,063	3,321	3,450	3,015	2,224
Protein, grams	103	100	105	91	125
Fat grams	116	119	130	114	84
Carbohydrate grams	399	460	462	405	241
Fruit used uncooked (grams edible portion)	91.6	143.8	115.2	122.5	83
Vegetables used uncooked (grams edible portion)	109.7	148.7	117.5	138.3	110.5

highest waste found reported in the literature still leaves adequate amounts of nutritive constituents. Assuming (inaccurately) that it is evenly distributed among the foods served, subtraction of this amount would leave a protein level of 88 grams, the average level of daily protein for the four months being 99.17 grams for each person, which is above the present protein standard. It has been reduced during the past year by significant reduction in the amount of meat. The daily per capita allowance of uncooked fruit, 3.2 ounces, 5 ounces, 4 ounces and 4.3 ounces; and of uncooked vegetables 3.8 ounces, 5.2 ounces, 4 ounces, and 4.8 ounces indicates adequacy of vitamins C—as far as present knowledge goes—since the typical raw fruits used with any consistency are those containing this vitamin in abundance, oranges, bananas, lemons, and grapefruit. Typical fresh vegetables used are celery, lettuce, tomatoes (in season) and cabbage.

Total energy per capita is 3000 calories or more, which at first sight seems high, but 200 of the 700 persons served are doctors, office and floor employees, and there is also a group of convalescent men whose appetites

TABLE 4

CLASS	S.U.I. HOSPITAL				CHILDREN'S HOSPITAL
	April, 1924	July, 1924	October, 1924	January, 1925	March, 1925
	Percentage distribution of protein among classes of foods				
	per cent	*per cent*	*per cent*	*per cent*	*per cent*
I	20.58	26.52	27.64	24.34	19.79
II	1.19	1.96	1.66	1.46	0.66
III	11.07	13.53	12.63	12.77	8.19
IV	.....	.....	.....	.....	.....
V	.....	.....	.....	.....	.....
VI	29.30	21.38	23.64	26.06	48.09
VII	38.15	36.59	34.41	34.83	23.22
	Percentage distribution of fat among classes of foods				
I	3.68	3.92	4.09	3.78	6.40
II	0.88	0.88	0.59	0.83	0.47
III	.....	.....	.....	.....	.....
IV	.....	.....	.....	.....	.....
V	42.6	52.6	53.86	50.27	55.87
VI	29.92	21.39	22.74	25.08	8.65
VII	22.96	21.17	18.70	20.01	28.58
	Percentage distribution of calories among classes of foods				
I	20.45	23.11	24.18	21.57	32.58
II	0.81	1.10	0.91	0.85	0.51
III	17.00	17.95	16.19	17.40	19.73
IV	11.08	14.71	13.06	13.95	3.78
V	14.64	17.11	15.42	17.16	19.61
VI	21.71	13.62	11.91	17.20	6.95
VII	15.51	12.36	18.30	12.19	13.77

Class I. Cereals and cereal products.
Class II. Legumes and shelled nuts.
Class III. Vegetables and fruits.
Class IV. Sugars and starches.
Class V. Fats and oils.
Class VI. Foods high in protein and fat.
Class VII. Animal products exclusive of whole milk and fat.

are vigorous and whose food needs are high. The number of grams of carbohydrate is approximately four times the number of grams of fat, and the average number of grams of cellulose per capita, table 5, is

TABLE 5

Analysis of cellulose from monthly bills

GROUP	AVERAGE CELLULOSE	APRIL		JULY		OCTOBER		JANUARY		MARCH (CHILDREN'S HOSPITAL)	
		Food (E.P.)	Cellulose	Food (E.P.)	Cellulose	Food (E.P.)	Cellulose	Food (E.P.)	Cellulose	Food (E.P.)	Cellulose
	per cent	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*	*pounds*
I. Cereals:											
Low per cent	0.476	7,930	37.74	9,369	44.59	12,727	60.58	7,904	37.61	2,665	12.68
High per cent	1.38	2,592.7	35.77	1,880	25.94	956	13.19	2,145	29.60	2,068	28.53
II. Dry legumes and shelled nuts:											
Dry legumes	3.3	190	6.27	300	9.9	310	10.23	200	6.6	60	1.98
Nuts	2.9	91	2.63	76	2.2	57	1.65	75	2.17	12.5	0.36
III. Vegetables and fruits:											
Potatoes—white	0.4	16,767	67.06	16,962	67.84	18,914	75.65	14,058	56.23	4,805	19.22
Potatoes—sweet	1.3	56	0.73			770	10.01	1,100	14.30		
Roots	1.3	2,255	29.31	1,864	24.23	2,452	31.87	2,168	28.18	680	8.84
Stem and leaf	0.87	3,774	32.83	6,494	56.49	5,749	50.01	4,493	39.08	2,329	20.28
Pod and seed	1.13	3,584	40.49	3,048	34.44	3,909	44.19	3,556	40.18	1,709	19.31
Served as vegetables	1.0	58	0.58			465	4.65				
Fruits—fresh and canned	1.8	7,916	142.5	8,375	150.7	6,776	121.9	8,434	151.8	3,392	61.0
Fruits—dried	2.53	1,511	38.22	1,128	28.53	945	41.90	1,118	28.28	324	8.19
Total pounds cellulose per month			434.1		444.8		465.8		434.0		180.39
Persons per day			731		602		661.0		645.0		274.0
Grams cellulose per person per day			8.6		10.4		9.9		9.5		9.5

nine, which is high. There is a possible error in the cellulose calculation involved in the use of the average percentage of cellulose given for the edible portion of fresh fruits in computing the grams of cellulose in canned fruits as well, although the weight of canned fruit was found by weighing the juice from several kinds of canned fruit and deducting its weight from the total weight in order to lessen the error as far as possible.

Comparison of this per capita allowance of calculation of nutritive value from locally standardized serving portions of actual menus containing the same types of food shows results corresponding on the whole rather reasonably with per capita allowance obtained from the monthly bills. The variations between these two results gives rough indication of waste in preparation, in service, and in plate waste. The menus show a variation in total energy from 2000 to 3100 calories in the amounts generally served on the wards; iron and phosphorus were generally low; and average protein was 83 grams. Additional milk available for patients' use on the floors raises the mineral and protein intake. Use of milk although left to the choice of the patients is urged. These figures correspond fairly well with computations from monthly bills when probable plate waste is considered in the latter.

Calculation of food purchased in the Children's Hospital shows the same general results, but since they cover only one month, and the census includes a more equal distribution among adults and children of all ages than in the general hospital, they are difficult to interpret with accuracy.

An adequate general diet such as is furnished in the S. U. I. Hospital has shown itself to be as wise from an administrative standpoint as it is necessary from a nutritive one: as it minimizes the calculation of individual diets, furnishes a sound basis for the special diet system, and groups together foods which stimulate the appetite and at the same time furnish nutritive constituents in amounts which have been found necessary by experimental work. Where the number of patients is large and individual attention cannot be given to all, an assured adequate general diet makes opportunity and time for special work with patients who particularly need it.

AN ECONOMIC ANALYSIS OF HOSPITAL FOOD BILLS

RUTH WHEELER AND VIVIAN MOE[1]

Tables 1 and 2 summarize an economic analysis of the food bills for the general university hospital for four typical months in 1924–5; the same bills which were analyzed in the preceding paper from a nutritive standpoint. Table 1 gives the total amount and cost of food purchased with unit cost calculated from these. At the foot of appropriate columns is shown the total number of meals served, the per capita cost of food per meal and per day. The total cost of raw food varied from $10,174.94 in July to $11,452.13 in October; the number of meals served varied from 55,948 in July to 65,729 in April; the per capita cost of raw food from 47 cents in April to 56 cents in October. The range can be narrowed without any great difficulty. Some of the reasons for it in this particular case are changes in market prices of foods used at all seasons; changes in policy as to the use of certain foods; indirect purchasing; requirement that meat orders shall be sent in 10 days before they are to be used; and the usual number of unforeseeable variations in census and in the number and kinds of special diets needed. This institution operates under a fixed state policy that the essential first consideration must always be the adequate feeding of all patients; all the year round, patients are given the food which they need, and so not only milk but such foods as eggs and oranges, for example, are constantly served because of their nutritive importance, especially for sick people. The market price of such foods will therefore be an important factor in the total and in the per capita cost. The daily per capita cost level compares favorably with that generally found in the better class of hospitals. Dr. Harvey Lee Barnes,[2] superintendent of the state sanitorium at Wallum Lake, Rhode Island, reports the per capita food costs of 61 institutions with an average of 65 cents; the largest number, 25, falling between 40 and 60 cents; only 4 below 40 cents; 24 between 60 cents and a dollar; and 3 spending more than a dollar per capita for food. Informal reports from many hospitals indicate that from 50 to 60 cents is the usual cost of

[1] The data in this paper are taken from the master's thesis of Vivian Moe, now on the Home Economics staff at the Iowa State College, Ames, Iowa.

[2] H. L. Barnes: Mass feeding in public sanitoriums. Mod. Hosp. 23, 67, 1924.

food in those hospitals in which the nutritive value of the general diet is known and guarded. The most progressive hospital administrators are looking forward to a system of food cost accounting that will allow periodical checking of cost distribution and nutritive value of food bought in their relation to each other. Only so, can they be certain that real economy is secured; only so can they defend expenditure or retrenchment when either is necessary.

Table 2 shows cost distribution among nutritive groups of foods. Since the most extended studies relating nutritive value and cost have been based upon family dietaries and so upon retail prices, it is necessary to do a good deal of careful checking in order to make any useful comparisons between the results of such studies and those based upon institution dietaries and wholesale prices. Checking is also necessary in comparing studies made in different institutions. For example here the proportion of total cost absorbed by the meat group is apparently far too high, milk too low; but the amount of meat allowance here represented is about 3–4 ounces edible portion per person per day which though too high is not comparable with per cent cost, and the milk allowance a pint and a half; not at all what one would expect from the cost percentages. Evidently the usual generalization that approximately one-fifth of the food allowance should be spent for each of the five food groups must here be checked to some extent by a study of the local market prices, especially in institutions. Wholesale buying may make disproportionate reductions in the respective prices of different foods; as compared with retail buying the relative reduction in the various food groups may be quite different in different localities. Here it will be noticed that milk, though obtained from two tested herds, and produced under the best conditions, constantly and easily open to inspection, costs only $7\frac{1}{2}$ cents a quart, while beef, bought in the carcass, cost 21 cents at the time these studies were made. Many institutions pay 10 cents a quart for milk and from 12 to 14 cents a pound for beef bought in the carcass. Refigured on this basis, increasing the price of milk 10 cents a gallon, and decreasing the cost of fresh meat only 5 cents a pound, the average cost of meat becomes 18.5 per cent of the total cost for the four months instead of 22 per cent, the cost of milk, about 20 per cent instead of 16 per cent. The larger amount spent for the milk group in April 23.4 per cent is due to the fact that ice cream was bought at that time. During the other three months it was made inside the hospital. It may be said here that the total amount of meat bought has been much reduced since this study was made, 6700 pounds being purchased in

TABLE 1

Analysis of food cost distribution—main and diet kitchen, State University of Iowa Hospital

FOOD	APRIL, 1924			JULY, 1924			OCTOBER, 1924			JANUARY, 1925		
	TOTAL		Unit cost	TOTAL		Unit cost	TOTAL		Unit cost	TOTAL		Unit cost
	Amount	Cost		Amount	Cost		Amount	Cost		Amount	Cost	
Meat—fresh	8,559 lbs.	$1,692.80	$0.1977	8,053½ lbs.	$1,573.33	$0.1953	7,955 lbs.	$1,880.86	$0.236	7,810½ lbs.	$1,775.51	$0.227
Soup bones	594	47.51	.08	341	27.33	.08	373	29.88	.08	482	38.56	.08
Canned	54 lbs.	27.72	.513				182 lbs.	70.40	.533	99 lbs.	56.48	.57
Smoked	776½ lbs.	179.40	.231	898 lbs.	205.64	.229	776 lbs.	218.54	.281	415.33 lbs.	120.45	.29
Fish—fresh	890½ lbs.	231.12	.259	845 lbs.	227.96	.269	917 lbs.	297.30	.324	911 lbs.	268.13	.294
Canned	3 cs.	35.55	11.85	42 cs.	7.34	.175	24 cs.	11.88	.495	1½ cs. 4 cs.	33.57	
Oysters	40¼ qts.	28.53	.704							15¼ qts.	12.61	2.18
Milk—butter	98 qts.	12.76	.13	76 qts.	9.90	.13	4 qts.	.52	.13	4 qts.	.31	.0775
Skim	850 gals.	127.50	.15	590 gals.	88.50	.15	868 gals.	130.20	.15	705 gals.	105.75	.15
Whole	3,492 gals.	1047.60	.30	2,956 gals.	886.80	.30	3,664 gals.	1,098.20	.30	3,505 gals.	1,051.50	.30
20 per cent cream	240 gals.	300.00	1.25	232¼ gals.	290.63	1.25	308 gals.	385.00	1.25	302 gals.	377.50	1.25
40 per cent cream	30¼ qts.	33.55	1.10	35 qts.	38.50	1.10	3 qts.	3.10	1.03	2 qts.	2.15	1.075
Ice cream	368 gals.	401.24	1.09	15½ gals.	19.31	1.26	53¼ gals.	57.18	1.069	74¼ gals.	78.72	1.053
Cottage cheese	53 qts.	18.55	.35	65 qts.	23.04	.35	26 qts.	9.19	.35	21½ qts.	7.66	.352
Cheese	35 hds.	122.54	3.50	33 hds.	94.29	2.86	34 hds.	110.10	3.27	23 hds.	78.72	3.42
Eggs	82 cs.	517.20	6.258	92 cs.	659.10	7.16	102 cs.	1,236.80	12.125	67.27 cs.	1,027.63	15.276
Butter	1,710 lbs.	683.98	.399	1,599 lbs.	675.70	.42	2,129 lbs.	769.07	.361	1,836 lbs.	757.43	.413
Vegetables—fresh		341.04			595.95			467.55			455.62	
Potatoes		341.90			365.58			272.63			201.84	
Canned	219 cs.	752.02	3.43	249½ cs.	800.79	3.209	152½ cs.	654.83	4.29	186½ cs.	621.66	3.33
Dried	280 lbs.	34.95	.1248	300 lbs.	52.50	.175	310 lbs.	45.00	.145	200 lbs.	34.70	.1735
Fruits—fresh		783.56			1,024.82			1,128.86			987.47	
Canned	107 cs.	509.31	4.76	87½ cs.	430.02	4.914	58½ cs.	277.23	4.766	64 cs.	270.76	4.23
Dried	1,716 lbs.	281.27	.164	1,277 lbs.	196.88	.154	1,024 lbs.	193.33	.188	1,217 lbs.	199.10	.1635
Bread	3,785 loaves	511.05	.135	4,295 loaves	584.40	.136	3,262 loaves	470.09	.113	3,670 loaves	495.68	.135
Rolls	159 doz.	23.85	.15	243 doz.	36.45	.15	334 doz.	50.10	.15	198 doz.	29.70	.15
Cookies	56 doz.	8.40	.20	66 doz.	9.90	.15	37 doz.	5.55	.15	30 doz.	4.50	.15
Cereals	30 cs., 1 pkg.	128.38	4.27	35 cs. 6 pkg.	143.08	4.06	35 cs., 6 pkg.	143.94	4.08	28 cs., 6 pkg.	103.92	3.727
Crackers	103 boxes	109.98	1.067	66 boxes	67.31	1.02	89 boxes	99.34	1.116	105 boxes	111.23	1.059
Macaroni, etc.	560 lbs.	36.13	.064	652 lbs.	51.20	.078	325 lbs.	22.75	.07	475 lbs.	39.88	.084
Flour	1,310 lbs.	44.08	.033	1,250 lbs.	40.26	.0322	1,240 lbs.	43.10	.0347	1,050 lbs.	43.96	.0418
Sugar	3,600 lbs.	371.88	.103	4,150 lbs.	331.25	.0798	4,525 lbs.	510.32	.112	4,000 lbs.	354.82	.0887
Cocoa							120 lbs.	18.00	.15	60 lbs.	9.00	.15
Coffee	500 lbs.	192.50	.385	500 lbs.	192.50	.385	600 lbs.	234.00	.39	600 lbs.	282.00	.47
Coffee-Hag							10 lbs.	6.30	.63	12 lbs.	7.56	.63
Tea	400 balls	12.10	.03	70 lbs.	35.00	.50	80 lbs.	47.20	.59	30 lbs.	16.20	.54
Candy	3 cs., 54 lbs.	57.35		65 lbs.	27.46	.42	76 cs.	30.05	3.96	8 cs.	33.72	4.02
Nuts	91 lbs.	33.58	.369	76 lbs.	25.89	.34	57 lbs.	20.21	.3545	75 lbs.	42.20	.35
Condiments		12.89			30.35			24.85			41.73	
Vegetable fats	510 lbs.	108.90	.214	720 lbs.	141.90	.197	870 lbs.	211.95	.243	700 lbs.	155.40	.222
Oils	20 gals.	33.12	1.65	17⅛ gals.	26.80	1.50	20 gals.	32.48	1.624	15 gals.	25.20	1.68
Lard	8 lbs.	1.44	.18	8 lbs.	1.22	.152	8 lbs.	1.60	.20			
Miscellaneous		58.83			136.06			131.65			201.06	
Total		$10,296.06			$10,174.94			$11,452.13			$10,561.28	
Meals served		65,729			55,948			61,399			60,033	
Cost per meal		15.7¢			18¢			18.7¢			17.8¢	

Meals served	65,729			55,948			61,399			60,033		
Cost per meal	15.7¢			18¢			18.7¢			17.8¢		

FOOD	APRIL, 1924, PER 100		JULY, 1924 PER 100		OCTOBER, 1924, PER 100		JANUARY, 1925, PER 100	
	Amount	Cost	Amount	Cost	Amount	Cost	Amount	Cost
Meat—fresh	1,171.98 lbs.	$231.80	1,338.91 lbs.	$261.57	1,204.94 lbs.	$284.89	1,210.93 lbs.	$275.22
Soup bones	9.86	6.506	9.48	4.54	7.57	4.53	9.604	5.93
Canned	7.39 lbs.	3.796			19.99 lbs.	10.66	15.33 lbs.	8.75
Smoked	106.33 lbs.	24.55	149.29 lbs.	34.19	117.54 lbs.	33.10	64.34 lbs.	18.66
Fish—fresh	121.94 lbs.	31.65	140.48 lbs.	37.90	138.958lbs.	45.03	141.13 lbs.	41.54
Canned	0.41 cs.	4.87	6.98 cs.	1.22	3.64 cs.	1.80		5.20
Oysters	5.55 qts.	3.90					2.36 qts.	1.95
Milk—butter	12.42 qts.	1.75	12.64 qts.	1.65	0.606 qt.	.079	0.619 qt.	.048
Skim	116.39 gals.	17.46	98.09 gals.	14.71	131.48 gals.	19.72	109.22 gals.	16.38
Whole	467.79 gals.	143.45	491.44 gals.	147.31	554.98 gals.	166.34	542.99 gals.	162.90
20 per cent cream	32.86 gals.	41.08	38.65 gals.	48.32	46.65 gals.	58.32	46.79 gals.	58.48
40 per cent cream	4.176 qts.	4.59	5.82 qts.	6.40	0.454 qts.	.47	0.3098 qts.	.333
Ice cream	50.39 gals.	54.94	2.54 gals.	3.21	8.10 gals.	8.66	11.58 gals.	12.20
Cottage cheese	7.26 qts.	2.54	10.81 qts.	3.83	3.94 qts.	1.39	3.37 qts.	1.19
Cheese	4.79 hds.	16.78	5.49 hds.	15.68	5.15 hds.	16.83	3.56 hds.	12.20
Eggs	11.22 cs.	70.82	15.295 cs.	109.58	15.51 cs.	187.34	10.42 cs.	159.20
Butter	23.42 lbs.	93.66	26.58 lbs.	112.34	322.48 lbs.	116.49	284.43 lbs.	117.34
Vegetables—fresh		46.69		99.08		70.82		70.58
Potatoes		46.82		60.77		41.29		31.27
Canned	29.98 cs.	102.97	41.48 cs.	133.13	23.1 cs.	99.19	28.89 cs.	96.31
Dried	38.34 lbs.	4.79	49.88 lbs.	8.73	46.96 lbs.	6.82	30.98 lbs.	5.38
Fruits—fresh		107.29		170.38		170.99		152.98
Canned	14.65 cs.	69.74	14.55 cs.	71.49	8.81 cs.	41.99	9.91 cs.	41.95
Dried	234.97 lbs.	38.51	212.3 lbs.	32.73	155.1 lbs.	29.28	188.54 lbs.	30.84
Bread	518.39 loaves	69.98	714.05 loaves	97.16	494.21 loaves	71.20	568.55 loaves	76.79
Rolls	21.77 doz.	32.66	40.0 doz.	6.06	50.59 doz.	7.59	30.67 doz.	4.60
Cookies	7.67 doz.	1.15	10.97 doz.	1.65	5.60 doz.	.841	4.65 doz.	.697
Cereals	4.108 cs.	17.58	5.82 cs. 0.998 pkg.	23.79	5.3 cs. 0.909 pkg.	21.80	4.34 cs. 0.93 pkg.	16.10
Crackers	14.1 boxes	15.06	10.97 boxes	11.19	13.48 boxes	15.05	16.26 boxes	17.23
Macaroni, etc.	76.68 lbs.	4.95	108.40 lbs.	8.51	49.23 lbs.	3.45	16.27 lbs.	6.18
Flour	179.38 lbs.	6.04	207.81 lbs.	6.69	187.82 lbs.	6.53	162.66 lbs.	6.81
Sugar	492.95 lbs.	50.92	689.94 lbs.	55.07	685.40 lbs.	77.30	619.67 lbs.	54.97
Cocoa					18.18 lbs.	2.73	4.30 lbs.	1.39
Coffee	68.47	26.36	83.13 lbs.	32.00	90.88 lbs.	35.44	92.95 lbs.	43.69
Coffee-Hag					1.515 lbs.	.954	1.86 lbs.	1.17
Tea	95.85 balls	1.66	11.64	5.82	12.12 lbs.	7.15	4.65 lbs.	2.51
Candy	8.90 lbs., 0.41 cs.	7.86	10.81 lbs.	4.57	1.1512 cs.	4.55	1.24 cs.	5.22
Nuts	12.46 lbs.	4.60	12.64 lbs.	4.30	8.63 lbs.	3.06	11.62 lbs.	6.54
Condiments		1.77		5.05		3.76		6.46
Vegetable fats	69.83 lbs.	15.03	119.70 lbs.	23.59	131.79 lbs.	32.10	108.44 lbs.	24.07
Oils	2.74 gals.	4.54	29.09 gals.	4.46	3.03 gals.	4.92	2.32 gals.	3.90
Lard	1.10 lbs.	.197	1.33 lbs.	.203	1.21 lbs.	.242		
Miscellaneous		8.06		22.62		19.94		31.15
Total		$1,409.84		$1,691.594		$1,734.65		$1,636.28

January 1926 at a cost 15.2 of the total food cost (also 866 pounds of fish at 2.6 per cent of total cost).

The relative amount spent for fruits and vegetables is high, in line with recent advances in knowledge of the nutritive value of these foods, especially for the sick. As a source of vitamins B and C every patient in the hospital may have an orange daily; many groups, such as those on

TABLE 2

Food cost distribution among nutritive groups of foods

FOOD GROUPS	APRIL, 1924		JULY, 1924		OCTOBER, 1924		JANUARY, 1925	
	Amount spent	Per cent of total	Amount spent	Per cent of total	Amount spent	Per cent of total	Amount spent	Per cent of total
Meat, Fish, Poultry	$2,242.63	21.7	$2,041.60	20.0	$2,508.86	21.9	$2,305.31	21.8
Eggs	517.20	5.0	659.10	6.4	1,236.80	10.8	1,027.63	9.7
Milk, Cream, Ice cream, Cheese	$2,063.74	20.0	$1,450.97	14.2	$1,794.49	15.7	$1,702.00	16.1
Fruits, Vegetables	$2,702.15	26.2	$3,100.96	30.5	$2,766.80	24.1	$2,569.31	24.3
Cereal products, Potatoes	$1,203.77	11.7	$1,298.18	12.8	$1,107.50	9.7	$1,030.71	9.8
Sugar, Fats	$1,199.32	11.7	$1,176.87	11.6	$1,525.42	13.3	$1,292.85	12.2
Miscel'aneous	$367.25	3.5	$447.26	4.4	$512.26	4.5	$633.47	6.0
Totals	$10,296.06	100.0	$10,174.94	100.0	$11,452.13	100.0	$10,561.28	100.0

high liquid or high carbohydrate diets have more than one, and this alone would keep the expenditure for these foods high. Besides at least 2 servings of fruit, three or four servings of vegetables other than potatoes are included in the general daily diet to provide a source of minerals, vitamins and cellulose. Since bed patients even those without the muscular weakness so often accompanying illness are nearly always constipated, they need more rather than less laxative foods than those who

can move about. These foods moreover, must be in soft smooth forms of cellulose, in order to avoid intestinal irritation.

Fuel foods in this institution absorb a much smaller proportion of food costs than the usual standard allowance, partly because we get a particularly good price on these foods, partly because fruit is so much used for dessert rather than puddings, partly also because breakfast and supper cereals were so often left untouched leaving the patients underfed in consequence that they have been replaced on the menus by other foods.

TABLE 3

Food cost distribution among nutritive groups of foods using adjusted prices for fresh meat and milk

	APRIL, 1924			JANUARY, 1925			JANUARY, 1926
Meat, Fish, Poultry	1,814.68	17.7	(21.7)	1,914.81	18.2	(21.8)	(18)
Eggs	517.20	5.1	(5)	1,027.63	9.7	(9.7)	(8.7)
Milk, Cream, Ice cream, Cheese	2,412.94	23.5	(20)	2,052.50	19.5	(16.1)	
Fruits, Vegetables	2,712.15	26.5	(26.5)	2,569.31	24.4	(24.3)	
Cereal products, Potatoes	1,203.77	11.7	(11.7)	1,030.71	9.8	(9.8)	
Sugar, Fats	1,199.32	11.7	(11.7)	1,199.32	12.2	(12.2)	
Miscellaneous	367.25	3.5	(3.5)	633.47	6	(6)	
	10,227.11			10,521.28			

Such an analysis as this can furnish evidence that the total food purchased is or is not right from a nutritive standpoint only if it is assumed that food waste is not excessive and that the food is distributed among the patients and the personnel with some evenness. A comprehensive study of food waste begun at the same time as these studies here reported, though not yet completed, indicates: *first* that there is now no significant amount of food leakage; *second*, that size of servings is reasonable; *third*, that plate waste, extremely irregular, comes from carelessness in seasoning or serving, fairly easy to cor-

rect, or from prejudice, capricious appetites, and ignorance of nutritive values, very difficult to amend; and *fourth* that even for 700 people it is not yet possible to make a useful general statement of the percentage which must be subtracted from the amount served in order to estimate the amount actually eaten. Among the entire 700 persons served in this hospital the distribution is more even than in most hospitals; less difference is made between private and state cases than is usual between private and ward cases; the principle being that every patient must have all nutrient essentials in a form suited to this condition; that private patients may then have luxuries in addition to essentials. On the whole, private patients here are much like the rest of us; they demand few rare or unusual foods; and so distribution both of nutrients and cost is found to be fairly even.

SUMMARY

The average per capita cost of food for the 650 to 700 people served daily in the general hospital of the State University of Iowa was 53 cents for four typical months in 1924–25; of this about 22 per cent was spent for meat, from 5 to 10 per cent for eggs, (depending upon market price which varied 150 per cent in this period) about 15 per cent for milk and milk products (20 per cent in one month when ice cream was bought outside the hospital); about 25 per cent for fruit and vegetables, and from 22 to 24 per cent for fuel foods. Meat prices being higher here than in most institutions and milk prices lower, these were adjusted for comparison, 5 cents being subtracted from the cost of fresh meat per pound, and 10 cents being added to the cost of whole milk per gallon, with the result that the percentage cost of meat became 18½ instead of 22, and the percentage cost of milk 20 instead of 16. Fruit and vegetables cost about 25 per cent of the total, fuel foods about 22 per cent. Attention is called to the fact that the figures suggested for food cost distribution in family budgets are not safe standards for institutions until they have been checked by using either per capita weight allowance of essential foods, or unit prices, or both.

CARBOHYDRATE STUDIES IN ARTHRITIS

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A survey of the literature reveals many attempts to treat arthritis by diet but the results are difficult to evaluate because of inadequate controls, incomplete data and varying methods of attack. The purpose of this paper is to summarize recorded observations, to analyze them from the viewpoint of nutrition and to report a series of studies of carbohydrate utilization in arthritis as shown in blood sugar curves in the post absorptive period and after the ingestion of food and of varying amounts of glucose.

Diet therapy in arthritis has been prompted by the postulating of two possible contributory factors in the disease: (*a*) toxicosis from the absorption of putrefactive products from the intestines; (*b*) a metabolic disturbance producing symptoms like those of gout. Pemberton's early papers (1) reported attempts to reduce the absorption of toxins by feeding a non-putrefactive diet as a supplement to colonic lavage and operative procedure. Metabolic studies in cases of arthritis have been made by several investigators. Cecil, Barr and Du Bois (2) concluded that the gas exchange and nitrogen metabolism were within normal limits; they were unable to confirm previous reports of variations in the basal metabolism (3). No consistent variation from the normal is evident in the many biochemical measurements recorded in the literature (4) except that blood sugar values indicate a possible decrease in ability to handle carbohydrate in the quantities usually ingested (1, 4, 5).

An analysis of the diets used by various investigators in the treatment of arthritis reveals that they fall roughly into three groups. The first (1) of these was designed to alleviate constipation and consisted largely of milk and fruits. The second group consisted of diets of low energy value. The plan was to observe the voluntary intake of the patient and then furnish him with a diet containing smaller amounts of food. In some instances (6) the character of the constituents of the diet was not changed. In other instances (7) fruits and vegetables were substituted for the more concentrated starch foods. The diets of the first group

mentioned above were also essentially low in energy value. The third group, the so called low carbohydrate diets, are difficult to distinguish from those low in energy value. For instance, one phase of Fletcher's (8) method of reducing the carbohydrate intake of the patient was to give an initial diet which contained but 750 calories daily. The low carbohydrate diets of Pemberton (9) are in many instances low also in energy value. Olmsted and Gay (10) have reported the use of diets which contained little carbohydrate, but furnished adequate energy.

Statements in the literature which indicate improvement obtained by the use of "low carbohydrate diets" in arthritis are subject to misinterpretation. In many instances these diets were not particularly low in carbohydrate while in other instances low energy value was associated with the low carbohydrate. The mineral and vitamin content of the diets varied greatly. It is possible that at least part of the therapeutic value of these diets was due to the increased intake of vitamins and mineral salts. There would seem to be no conclusive evidence that the improvement was due to the reduction of the carbohydrate or any one particular constituent when so many constituents were changed at the same time.

It is significant that each type of diet modification seemed to be of benefit to the patients of some observers while other observers were less sanguine as to the benefits obtained. Many studies covered a relatively short period of observation. Some investigators failed to take into account the spontaneous periods of improvement which characterize chronic arthritis.

Many of the studies of arthritics have been concerned with the variations of the blood sugar levels in these patients following the ingestion of carbohydrate. Hyperglycemia seemed to be quite constant. It has been claimed that the elevated blood sugar values indicate metabolic inadequacy (6) and that this factor is in part responsible for the development of the arthritis. This theory has served as a basis for the use of low carbohydrate diets in the treatment of arthritis. There is considerable evidence that the blood sugar variations are secondary to other factors such as inadequate circulation (11) and chronic infections (9, 12).

The plan of the experimental work here reported was to seek further information as to the fate of carbohydrate in arthritic patients. Studies of blood sugar concentrations have been made during the post-absorptive period and after the ingestion of glucose. Comparison has been made of the response to the administration of different amounts of carbohydrate in glucose and as part of a meal respectively; both arthritics and non-

arthritics were observed. No patient was manifesting an abnormal temperature at the time the tests were made. In all the tolerance tests to be described no food had been administered for several hours previously (five hours in four cases and twelve hours in all others). In the first group each patient received 25 grams of glucose; in the second group each received 100 grams. Blood samples were collected before the ingestion of glucose and at one and two hour intervals after its administration.

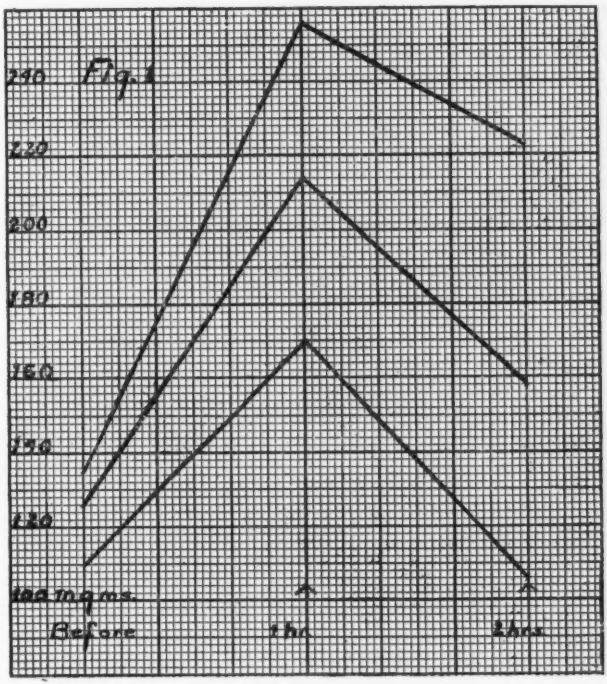

FIG. 1. AVERAGE BLOOD SUGAR VALUES OBTAINED FROM 10 ARTHRITICS AFTER THE INGESTION OF 25 GRAMS OF GLUCOSE

No attempt was made to follow the return to resting value. Capillary blood was used and the sugar content determined according to a micro Folin-Wu method (13).

In the first series 10 arthritic patients and 10 non-arthritic patients thirteen to forty years of age, were the subjects. The degree of arthritic involvement varied greatly. Figure 1 shows the highest, lowest and

average values obtained in arthritic patients. Neither the height nor the duration of the curve seemed to parallel the severity of the disease. In no case was glycosuria produced. Figure 2 shows the highest, lowest and average values similarly obtained in the control group of non-arthritic patients. It will be noted that the highest of these is lower than the lowest value obtained from the arthritic patients.

In the second series of observations four of the arthritic patients of the first series were given 100 grams of glucose. Figure 3 shows the resultant

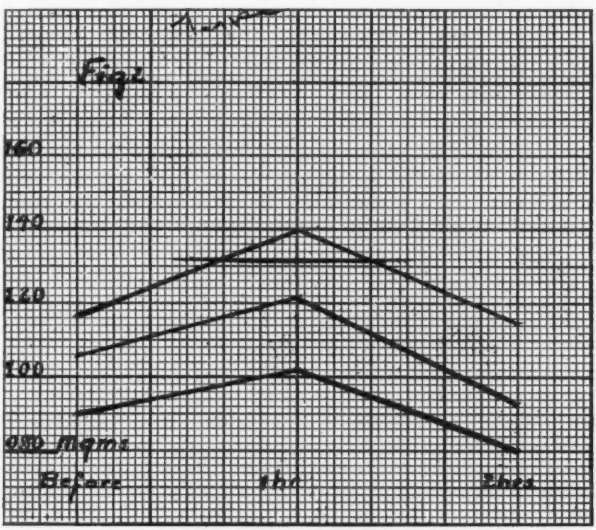

FIG. 2. AVERAGE BLOOD SUGAR VALUES OBTAINED FROM 10 NON-ARTHRITICS AFTER THE INGESTION OF 25 GRAMS OF GLUCOSE

curves plotted with the curves obtained with 25 grams of glucose. The similarity of the curves is striking.

The post-absorptive blood sugar values of these patients were higher than is usually observed in normal individuals. A comparison was made of the morning fasting blood sugar concentration of 15 arthritic patients with similar values from ten non-arthritic controls. The results are recorded graphically in figure 4. The values obtained from arthritic patients range from 115 to 138 mgm. per 100 cc. of blood, while the controls gave values from 90 to 118 mgm.

A group of four arthritic patients had been receiving for several months a diet restricted in carbohydrate. The blood sugar values were

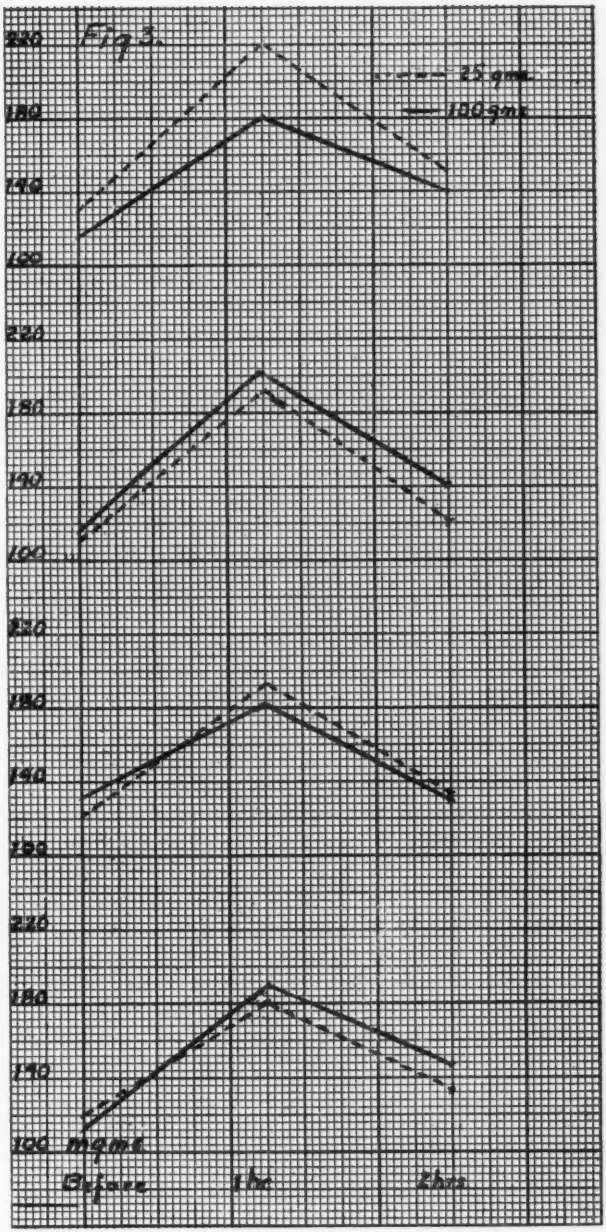

FIG. 3. BLOOD SUGAR VALUES OF 4 PATIENTS AFTER THE INGESTION OF 25 AND 100 GRAMS OF GLUCOSE

observed on a controlled diet which contained about 25 grams of protein, 30 grams of carbohydrate and 40 grams of fat at each meal. After observing the blood sugar response to this meal the patients were given a diet with the protein and fat unchanged but with a carbohydrate content of 90 grams per meal. After three days on this diet blood sugar values of three of these patients were again observed. The blood sugar values of the fourth patient were observed after she had been on the diet for three weeks. Figure 5 shows the response of these patients to the different diets. The curves are similar in each instance. The blood

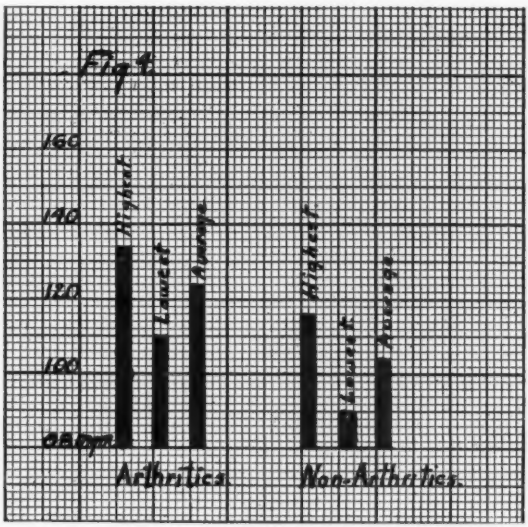

FIG. 4. POST-ABSORPTIVE BLOOD SUGAR VALUES OF 15 ARTHRITICS AND 10 NON-ARTHRITICS

sugar value two hours after the meal was practically the same whether the carbohydrate content of the meal was large or small.

The response of one arthritic patient to a variation of the carbohydrate intake was studied more extensively. This patient had been on a restricted carbohydrate diet for over six months. The actual intake during this period of time was not calculated but the patient was allowed no potatoes, bread, sugar nor starchy puddings. Fresh fruits and vegetables had been allowed in abundance. The blood sugar values were determined after the ingestion of 25 grams of glucose, and after a low carbohydrate meal (protein 25 grams, carbohydrate 30 grams, fat

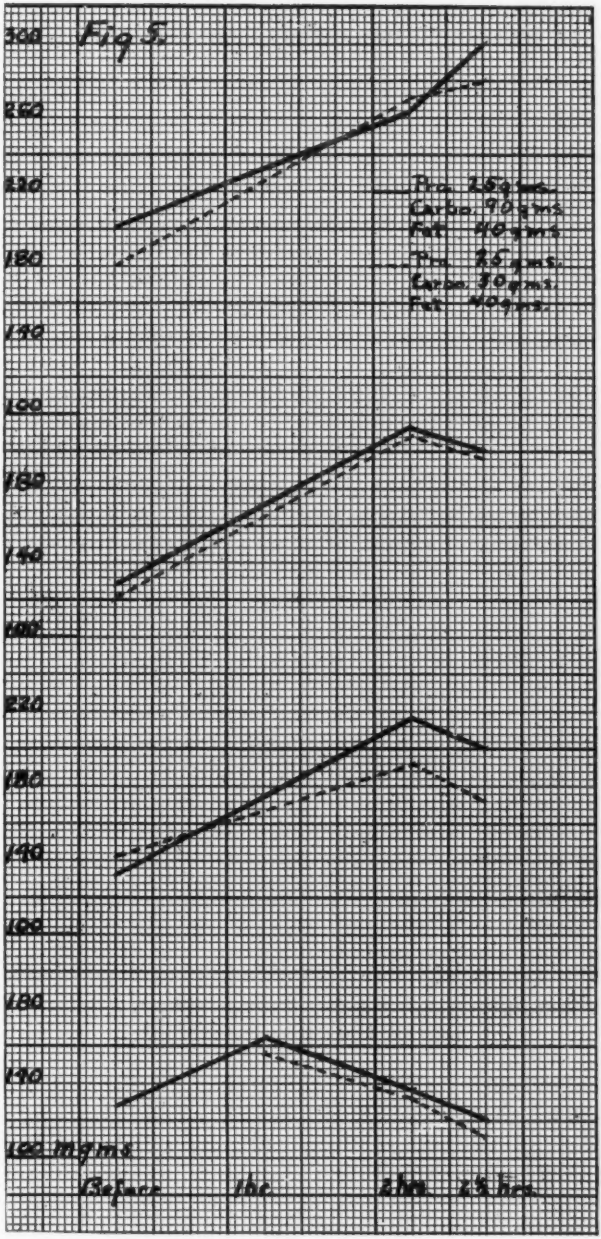

FIG. 5. THE BLOOD SUGAR RESPONSE OF 4 PATIENTS TO MEALS CONTAINING LARGE AND SMALL AMOUNTS OF CARBOHYDRATE

35 grams). The carbohydrate of the diet was then increased to 100 grams at each meal. The protein and fat intake was unchanged. After three weeks on the higher diet her blood sugar response to this meal and to 100 grams of glucose was determined. The values obtained from the four observations are plotted in figure 6. The similarity of the response to the varying amounts of glucose and to the different diets is significant.

In view of the rather general assumption that low carbohydrate diets have a therapeutic value in arthritis it is interesting to note that during

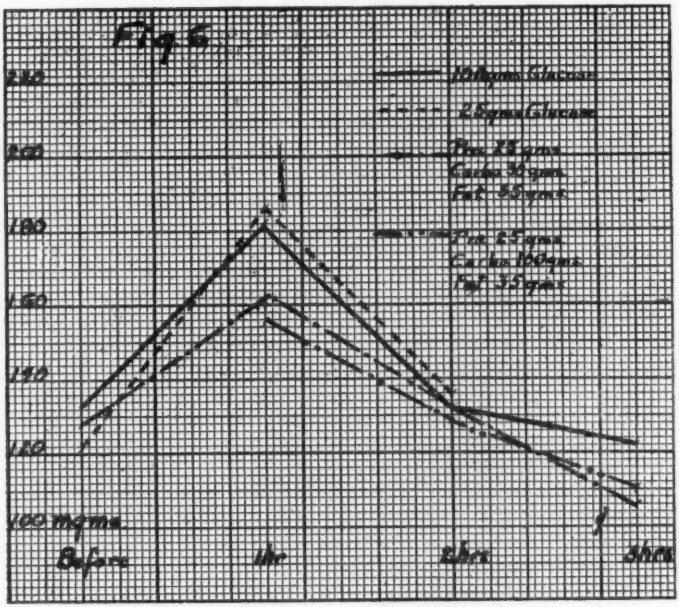

FIG. 6. BLOOD SUGAR VALUES OF 1 PATIENT AFTER 25 AND 100 GRAMS OF GLUCOSE AND AFTER HIGH AND LOW CARBOHYDRATE MEALS

these observations in no instance was there an increase in clinical symptoms when a high carbohydrate diet was fed. This is in accord with the observations of Olmsted and Gay (10). In treating their arthritic patients they have employed diets adequate in energy value but low in carbohydrate. They have reported that the clinical response to this therapy is disappointing. Schmitt and Adams (14), commenting on chronic arthritis in their diabetic patients, state that the low carbohydrate diabetic diet does not alleviate the arthritic symptoms.

Our experimental evidence would indicate that chronic arthritis is accompanied by elevations of the usual blood sugar level. That this is not immediately due to carbohydrate ingestion is evidenced by the fact that resting values are higher than normal, and that the exaggerated response is elicited by small amounts of glucose as well as by large amounts.

Correlating these findings with the reports of others that low carbohydrate diets have not generally proved of therapeutic value in arthritis, the rationale of employing this form of therapy in the treatment of arthritis seems questionable. It must be recognized, however, that the persistence of hyperglycemia may have deleterious effects. It seems probable that restoration of normal circulation and muscle volume and subsidence of chronic focal infection would permit a spontaneous correction of hyperglycemia. At any rate this brief study affords no evidence that restriction of the carbohydrate intake will correct the anomaly.

CONCLUSION

While diet therapy is undoubtedly an important adjunct to the treatment of arthritis, its value in correcting the hyperglycemia of arthritis is not indicated in the literature nor in the experimental studies herein reported.

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DIABETIC DIETS FOR CHILDREN

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A system of dietary management of juvenile diabetes mellitus has recently been described by one of us.[1] It was designed to approximate the theoretical energy requirement of an active child, furnishing 1 gram or more of protein for each theoretical pound of body weight, and potential glucose and fatty acid in a ratio of 1 to 1½. The unit diet formula chosen for the purpose contains protein, carbohydrate, and fat in the ratio of 7:9:21 respectively.

To determine the needs of the patient the theoretical body weight is estimated from the standing height, using standard height-weight tables[2] as a guide. The theoretical caloric requirement[3] for the weight is then estimated from a table prepared for that purpose (table 1).

Table 2 expresses the quantitative relation between various factors of the diet formula. For example, table 2 indicates that a child 37 inches tall will need 1275 calories daily for full activity, and that 35 grams of protein, together with carbohydrate and fat in the ratio 7:9:21 will supply the requisite energy. To obtain this diet, the weights of foods given in the column marked "35" are used. When the desired caloric value is not closely approximated in one of the diet columns, it may be obtained by interpolation.

The diets offered in tables 3, 4, and 5, have been calculated for use in this system of dietary management, and are applicable to diabetic patients throughout the period of childhood. They supply three equal meals. One teaspoon of cod liver oil has been substituted for 4 grams of fat in the morning meal to insure an adequate supply of vitamins A and D. Protein, carbohydrate and fat are in the ratio of 7:9:21. For convenience in calculation and assurance of adequate intake of its constituents, five times this unit, or 35:45:105 was used as a constant, in the form of 840 cc. of milk and cream, two teaspoons of butter, about 2 eggs, and 5 grams of carbohydrate in the form of fruits and vegetables; these

[1] Boyd, J. D. Use of Standard Diet Formulas in Management of Juvenile Diabetes. Proceedings of Pediatric Section, A. M. A., 1926.

TABLE 1

Height: weight: caloric requirement table

(When protein, carbohydrate and fat are used in the ratio of 7:9:21, respectively, then the thoretical calories will be approximated if protein is given in the quantity indicated under the column on the right. Height: weight ratios from Baldwin and Wood, and Woodbury.[2] Estimated calories from Holt and Fales.[3]

HEIGHT	WEIGHT		CALORIES FOR FULL ACTIVITY		GRAMS PROTEIN	
	Boys	Girls	Boys	Girls	Boys	Girls
inches	*pounds*	*pounds*				
30	22	21	950		26.5	
31	23	23	1,000		28.0	
32	24	24	1,060		29.0	
33	26	25	1,110		30.5	
34	27	26	1,135		32.0	
35	29	29	1,190		33.0	
36	31	30	1,230		34.0	
37	32	31	1,275		35.0	
38	33½	33	1,300		36.0	
39	35	34	1,340		37.5	
40	36	36	1,380		38.5	
41	38	37	1,440		39.5	
42	39	39	1,420		41.0	
43	41	41	1,540		42.5	
44	44	42	1,590		44.0	
45	46	45	1,650		45.5	
46	48	47	1,745		47.0	
47	50	50	1,800		50.0	
48	53	52	1,900		52.5	
49	55	55	1,990		55.0	
50	58	58	2,100		58.0	
51	61	61	2,200		61.0	
52	64	64	2,310		64.0	
53	68	68	2,470		68.0	
54	71	71	2,580		71.0	
55	74	75	2,730		75.0	
56	78	79	2,860		79.0	
57	82	84	2,980	3,070	82.0	84.0
58	85	89	3,090	3,230	85.0	89.0
59	89	95	3,230	3,440	89.0	99.0
60	94	101	3,400	3,400	94.0	94.0
61	99	108	3,590	3,300	99.0	91.0
62	104	114	3,770	3,130	104	86.5
63	111	118	3,930	2,900	108	81.0
64	117	121	4,060	2,760	112	77.0
65	123	125	4,030	2,630	111	73.0
66	129	129	3,850	2,530	107	70.0
67	133	133	3,700	2,530	101	70.0
68	139	138	3,520	2,530	97	70.0

[2] Supplement to "Mother and Child, July, 1923.

[3] Amer. Journ. Dis. Child., 21:1 (January, 1921.)

foods make up the entire intake of a child about three years of age. For older children this constant is used, but supplemented in accordance with the formula to satisfy requirements. An attempt is made to give as nearly one quart of milk every day as possible, to give fat in the form of butter, cream and egg yolk, and to include vegetables high in minerals and vitamins. In the hospital the patients are taught to eat all vegetables. The mothers are told that after the children leave the hospital it is advisable to serve spinach, pressed through a sieve, at least three times a week to the younger children and twice a week to the older ones. Lettuce and celery in amounts of 20 grams in the smaller diets and 30 grams in the larger ones may be used daily to afford more cellulose, minerals, and vitamins.

TABLE 2

PROTEIN	CARBOHYDRATE	FAT	POTENTIAL		RATIO	CALORIES
			Glucose	Fatty acid		
grams	*grams*	*grams*				
1.0	1.28	3.0	2.165	3.16	1:1½	36.1
7.0	9.0	21.0	15.16	22.12	1:1½	253.0
2.76	3.55	8.3	5.95	8.74	1:1½	100.0

The above table shows the relationship between the various factors of the diet when the protein, carbohydrate and fat, are in the ratio of 7:9:21 respectively.

The diets from 35:45:105 to 70:90:210 are merely multiples of the constant. Above this point the multiplication of these foods would give a diet containing excessive amounts of liquid and fibre. In diets from 70:90:210 to 105:135:315 therefore, more concentrated foods are incorporated.

The diets are planned to satisfy the energy needs of an active child. When it is necessary to impose bed rest the butter may be omitted from the diet. This will lower the caloric intake without materially disturbing the glucose-insulin adjustment. A liquid diet may be made from these forms without further calculation. The cereal may be made into gruel, the egg used as soft custard, the vegetables made into soup, and fruit juice may be used instead of fruit.

In order to permit closer approximation to the theoretical number of calories than the variations offered by these menus will give, the mean values may be interpolated. In the diets containing less than 49 grams of protein these interpolated values have been incorporated in the diets presented. The constituents of the diets below 35:45:105 do not decrease in direct proportion as do other diets of the series. The fruits and

TABLE 3

		28	31	35	38	42	46
	Breakfast						
Use all	Milk	120	140	150	155	160	165
	Cream 18 per cent	100	110	130	130	140	145
	Butter	0	1	1	3	3	5
	Egg	20	20	28	32	36	40
One only	Tomato	45	45	45	80	115	150
	Orange	15	15	15	28	40	52
	Orange juice	18	18	18	32	46	60
	Apple	12	12	12	22	32	42
	Dinner and supper						
Use all	Milk	120	140	150	155	160	165
	Cream 18 per cent	100	110	130	135	140	145
	Butter	4	5	4	6	8	10
One only	Egg	20	20	28	33	38	43
	Beef +	13	13	18	21	24	27
	Butter	1	1	2	2	3	3
	Chicken +	13	13	18	21	24	27
	Butter	2	2	3	3	4	4
	Fish +	13	13	17	20	23	26
	Butter	2	2	3	3	4	4
	Canned salmon +	13	13	17	20	23	26
	Butter	0	0	0	1	1	2
One only	Tomato	45	45	45	55	65	75
	Spinach	48	48	48	60	72	84
	String beans	48	48	48	59	70	81
	Turnips	22	22	22	27	32	37
	Peas	17	17	17	21	25	29
	Carrots	18	18	18	23	28	33
	Cabbage			11	17	23	28
	Onions			9	18	26	34
	Squash			10	20	30	40
One only	Orange juice					12	18
	Orange					11	16
	Fresh peach					14	21
	Fresh pears					9	14
	Apple					9	14

One teaspoon cod liver oil daily in the morning

Twenty grams lettuce or celery may be used twice daily in addition to the above menu.

TABLE 4

		35	42	49	56	63	70
	Breakfast						
Use all	Milk	150	160	170	180	190	200
	Cream 18 per cent	130	140	150	160	170	180
	Butter	0	3	6	9	12	16
	Egg	28	36	44	52	60	68
	Bacon			16	24	32	40
One only	Farina			4	5	7	9
	Oatmeal			4	6	8	10
	Cornflakes			3	4	6	8
	Puffed wheat			4	5	7	9
One only	Tomato	45	115	105	135	165	195
	Orange juice	18	46	42	54	66	78
	Orange	15	40	37	48	59	70
	Apple		20	30	39	48	57
	Dinner and supper						
Use all	Milk	150	160	175	185	200	210
	Cream 18 per cent	130	140	150	160	170	180
	Butter	4	8	12	17	21	27
One only	Egg	28	38	48	58	68	78
	Beef + Butter	18 / 2	24 / 3	32 / 3	38 / 4	44 / 4	52 / 5
	Chicken + Butter	18 / 3	24 / 4	32 / 5	38 / 6	44 / 7	52 / 8
	Liver + Butter	19 / 3	26 / 4	32 / 4	40 / 5	48 / 5	54 / 6
	Fish + Butter	16 / 3	23 / 4	30 / 5	35 / 6	41 / 7	46 / 8
	Canned salmon + Butter	17 / 1	23 / 1	30 / 2	36 / 2	43 / 3	50 / 3
	Cheese Minus butter	13 / 3	20 / 4	25 / 5	30 / 6	35 / 6	40 / 7
One only	Tomato	45	65	85	105	125	145
	Spinach	48	72	96	120	144	168
	String beans	48	70	90	110	132	152
	Cabbage		46	60	74	88	102
	Turnips	22	32	42	52	52	72
	Peas	17	25	34	42	50	58
	Carrots	18	25	36	45	54	64
	Onions		26	34	42	50	58
	Squash		30	38	48	56	65
	Potato		15	20	25	30	35

TABLE 4—*Continued*

		35	42	49	56	63	70
	Dinner and Supper—Continued						
	Orange juice		12	24	36	48	60
One	Orange		11	22	33	44	55
only	Fresh peach		14	26	38	52	65
	Fresh pear		9	18	28	36	45
	Apple		9	18	28	36	45

One teaspoon cod liver oil daily in the morning.
Thirty grams lettuce and celery may be used twice daily in addition to the weighed diet.

vegetables are kept constant below this point in order that the mineral and vitamin intake may not be further decreased. This adjustment is made by decreasing the milk, cream and butter.

If the very small child needs more than three meals a day, a small portion of the milk and cream mixture may be saved from the meal and given with lettuce, celery, or agar jelly for a lunch between meals.

These diets have been in use for about one year. Clinical observation suggests that they are physiologically adequate. Metabolic studies will be reported later.

TABLE 5

		35	70	77	84	91	98	105
	Breakfast							
	Milk	150	175	180	185	190	195	200
	Cream 18 per cent	130	155	160	165	170	175	180
Use	Butter	0	19	23	26	30	34	38
all	Egg	28	58	64	70	76	82	88
	Bacon		25	30	35	40	45	50
	Saltine		5	6	7	8	9	10
One only	Peanut butter		10	12	14	16	18	20
	Cheese +		11	13	15	18	20	22
	Orange		15	18	21	24	27	30
	Puffed wheat		8	9	10	12	13	15
One	Cornflakes		7	8	9	11	12	14
only	Farina		8	9	10	12	13	15
	Oatmeal		8	10	12	14	15	17
	Orange juice	18	38	42	46	50	54	58
One	Orange	15	33	36	40	43	47	50
only	Fresh peach	19	40	45	50	55	60	65
	Fresh pear	12	27	30	33	36	39	42
	Apple	12	27	30	33	36	39	42

TABLE 5—*Continued*

		35	70	77	84	91	98	105
	Dinner and supper							
Use all	Milk	150	175	180	185	190	195	200
	Cream 18 per cent	130	155	160	165	170	175	180
	Butter or Mayonnaise	4	29	34	39	44	49	55
	Saltine		5	6	7	8	9	10
One only	Egg	28	93	106	119	132	145	158
	Beef + Butter	18 / 2	57 / 5	66 / 6	74 / 7	82 / 8	91 / 9	97 / 10
	Chicken + Butter	18 / 3	57 / 10	66 / 11	74 / 12	82 / 14	91 / 15	97 / 17
	Fish + Butter	17 / 3	53 / 6	62 / 8	71 / 9	77 / 10	85 / 11	93 / 12
	Salmon + Butter	17 / 0	56 / 1	65 / 1	63 / 2	81 / 3	90 / 4	97 / 5
	Cheese Minus butter	14 / 3	44 / 8	50 / 9	56 / 10	62 / 11	68 / 12	74 / 13
Use two	Tomato	22	76	88	98	110	120	132
	Spinach	24	84	108	122	136	150	164
	Cabbage	11	50	58	68	75	82	90
	String beans	24	84	96	108	120	132	144
	Turnips	11	38	44	50	55	60	66
	Peas	9	32	38	42	46	50	55
	Carrots	9	34	40	44	50	54	60
	Onions	9	34	40	44	50	54	60
	Beets	9	32	36	40	46	50	55
	Squash	10	35	40	45	50	55	60
	Potato	5	18	20	22	25	28	30
One only	Orange		45	54	63	72	81	90
	Orange juice		50	60	70	80	90	100
	Fresh peach		54	63	74	85	96	106
	Fresh pear		36	43	50	57	64	72
	Fresh apple		36	43	50	57	64	72

One teaspoon of cod liver oil daily in the morning.

Thirty grams lettuce or celery may be used twice daily in addition to the above menu.

THE EFFECT OF VEGETABLE PURINES ON THE BLOOD IN GOUT

RUTH WHEELER AND BESSIE I. WALLACE[1]

The work of the past ten years with gout has been done largely in an effort to determine whether gout was due to faulty metabolism or to faulty elimination. McClure (1) concluded after a study of the renal function that "while renal retention explains many of the anomalies occurring in the excretion of uric acid and of other nitrogenous substances in gout, nevertheless this does not explain the nature of gout, nor does it preclude the possibility of there being an underlying perversion of metabolism." Pratt (2) emphasizes the derangement of metabolism as the primary factor.

The value of blood uric acid as a diagnostic test has been given considerable attention. Folin and Denis (3) report that Garrod and Brugsch believed in the diagnostic value of uric acid tests for gout, but Folin and Denis found uric acid high in a group of cases other than gout and felt that, "Neither qualitative tests for uric acid in the blood nor quantitative determinations of the uric acid alone can be depended on in the differential diagnosis of gout and other joint diseases." Meyers, Fine, and Lough (4) found that the blood picture in early interstitial nephritis was strikingly similar to gout in regard to the increase in uric acid; that as the permeability of the kidney was lowered it became apparent, first, by the retention of uric acid, later, of urea, and lastly be creatinin.

Less attention has been given to the purine content of foods, the effect of food purines on the uric acid content of the blood, and the excretion of uric acid. Denis (5) found that the ingestion of purine caused no increase in the uric acid in the blood of normal individuals but in persons suffering with renal insufficiency there was an increase in the uric acid content of the blood following purine feeding. Thymus was used as the source of purine by Denis. The effect of coffee, tea, and cocoa,

[1] The data in this paper are taken from the masters thesis of Bessie I. Wallace, now therapeutic dietitian at Mt. Sinai Hospital, Cleveland. Chemical work was done in the research laboratory of the department of internal medicine under the generous counsel of Dr. R. B. Gibson.

(6, 7) as well as purine retention (8) have been studied by foreign investigators. In this country Mendel and Wardell (9) studied the effect of coffee, tea, and caffein on the excretion of uric acid and found that they caused an increase in the amount of uric acid excreted. Also "the increase in excretion of uric acid after adding coffee, tea, or caffein to a purine-free diet seemed to be proportional to the quantity of caffein ingested." "The increase in the amount of uric acid excreted under these conditions is equal to the quantity of uric acid obtained by the demethylation and subsequent oxidation of from 10 to 15 per cent of the ingested purine."

The object in planning the present study was to determine the effect of purine from the common vegetables on subjects having gout.

EXPERIMENTAL

History of patient. V. R., male, was admitted to the hospital February 13, 1924, suffering with pain and swelling in the right knee, both ankles, and right great toe. Sodium biurate crystals were obtained from the top of the left helix, February 24, 1924. The patient has no family history of gout, has a negative blood Wassermann, is temperate, and has never weighed over 120 pounds. The patient is about 5 feet 3 inches tall. He had attacks of "arthritis" in April, June and December, 1922, had his tonsils removed and felt well until January previous to this admission. While in the hospital the patient was put in the metabolism ward, given a diet which was basic in reaction, and which contained neither animal nor vegetable purine. He was also given atophan and potassium bicarbonate to aid in the excretion of uric acid. The blood and urine uric acid were determined frequently by Dr. Gibson. The blood uric acid was 7.3 mgm. in 100 cc. on February 28 and rose to 8 mgm. in 100 cc. on March 3, he was given atophan and potassium bicarbonate on March 5, 6, 7, after which the blood uric acid dropped to 6 mgm. in 100 cc. The patient was discharged improved March 9, 1924, with a blood uric acid of 7 mgm. in 100 cc. From April 6 to June 26 the patient took his meals at the hospital in order that the effect of vegetables containing purine might be studied. Some clinicians have assumed that vegetable purines were not important in gout; others have excluded them as rigidly as meat purines. No serious studies could be found in the literature and it is important both that no risks of increasing urate retention should be taken and also that persons with a tendency to gout should not have their diet unduly restricted.

Diet. Periods containing a fixed amount of purine alternated with purine-free periods in order that the effect of one purine period would not hold over till the next. In some periods the purines were derived from vegetables and others from meat. The energy value averaged 2500 calories; the protein 66 grams, supplied by eggs, milk, cottage and cream cheese in the vegetable purine and purine-free periods and by eggs, milk, and meat in the meat purine period. Throughout the entire time the diet was predominantly basic because of the large amount of vegetables and fruits included. Fruits and vegetables containing benzoic or oxalic acid have been avoided with the exception of spinach and asparagus. The spinach was included to increase the iron in the diet and asparagus in the purine periods to help raise the purine content to

TABLE 1
Laboratory findings

DATE (1924)	URINE				BLOOD PER 100 CC.	DIET PURINE AV. GR.
	Volume	Specific gravity	Uric acid	Period average		
				mgm.	*mgm.*	
4–6	2,000	?	426	410		
4–7	2,100	?	301			
4–8	1,700	1.015	497			
4–9	1,700	1.010	414		6.38	
4–10	1,500	1.014	416	437		1.3
4–11	2,000	1.011	282?			off ½ day
	Loss					
4–12	2,000	1.012	541			
4–13	1,200	1.018	411			
4–14	1,400	1.017	380		5.01	

1.5 grams daily. Breakfast consisted of fruit, cereal, egg, toast, milk and cream: dinner, potato, two vegetables, salad, dessert, milk and cream, and frequently cheese: supper, vegetables, salad, soup or some carbohydrate and protein dish such as macaroni and cheese or toasted cheese sandwich, milk and cream and dessert. In the purine-free period the vegetables selected were beets, corn, carrots, spinach, celery, tomato, cabbage, or cauliflower. One diet (table 4) typical of the periods is included. The variations in the others are differences of combination or of salad or dessert selected. Fruit salads and fruit or custard desserts prepared in the diet kitchen were used whenever possible. During the purine periods the same general plan was followed, the vegetables being peas, beans, asparagus, and onions. All four vegetables and oatmeal

TABLE 2
Laboratory findings

DATE (1924)	URINE				BLOOD PER 100 CC.	DIET PURINE AV. GR.
	Volume	Specific gravity	Uric acid	Period average		
				mgm.	*mgm.*	
4–23	1,700	1.013	589		6.92	1.41
4–24	1,600	1.015	328	632.6		
4–25	1,600	1.016	661			
4–26	1,750	1.014	848			
4–27	2,100	1.013	747		9.09	
4–28	2,000	1.012	966			0.02
4–29	1,300	1.011	485	648.5		
4–30		No spec.				
5–1	1,450	1.011	527			
5–2	1,450	1.015	705			
5–3	1,250	1.016	559		6.66	
5–4	1,800	1.014	653			1.52
5–5	1,500	1.015	750	755		
5–6	1,600	1.012	674			
5–7	2,100	1.013	942		8.32	
5–8	1,900	1.015	578			0.02
5–9	2,000	1.013	654	750		
5–10	1,950	1.014	608			
5–11	1,400	1.017	683			
5–12	2,100	1.013	1,014			0.02
5–13	2,000	1.014	864		7.26	
5–14	1,400	1.014	486			1.46
5–15	1,900	1.010	904	799		
5–16	1,500	1.014	606			
5–17	1,600	1.012	674			
5–18	1,800	1.011	889			
5–19	1,900	?	1,235		9.3	
5–20	1,450	1.014	928			0.02
5–21	1,600	1.014	633	813.3		
5–22	1,650	1.014	879			
5–23	1,800	?	654			
5–24	2,100	1.012	925			
5–25	1,400	1.015	861		8.24	

were used daily to bring the total purine to approximately 1.5 grams. These foods were weighed and purine calculated according to the tables of J. Walker Hall (10). In the meat purine period purine-free vegetables

were used and 100 grams of T-bone steak added daily. The tables of Sherman and Goettler (11) and Sansum, Blatherwick and Smith (12) were used for acid and base balance of the foods. Table 5 illustrates the vegetable purine diets and table 6 the meat purine diets.

Laboratory methods. The uric acid was determined by Benedicts (13) calorimetric method using the Folin-Wu method to precipitate the blood proteins. This patient's blood contained so much uric acid that more accurate readings were obtained by using 2.5 cc. of tungstate filtrate instead of the usual 5 cc. The blood for uric acid determinations was

TABLE 3

Laboratory findings

DATE	URINE				BLOOD PER 100 CC.	DIET PURINE AV. GR.
	Volume	Specific gravity	Uric acid	Period average		
				mgm.	*mgm.*	
6–10–24	1,500	1.015	426		9.57	0.02
6–11–24	1,500	1.015	477	515.6		
6–12–24	1,350	1.015	463			
6–13–24	1,500	1.014	684			
6–14–24	1,100	1.015	528			
6–15–24	1,000	1.016	328			1.57
6–16–24	1,500	1.010	314	639.8		
6–17–24	2,400	1.010	911			
6–18–24	1,600	1.012	806		8.46	
6–19–24	1,050	1.016	582			0.02
6–20–24	1,550	1.012	575			
6–21–24	1,200	1.012	505			
6–22–24	1,200	1.015	623	614		
6–23–24	1,800	1.012	799		6.66	
6–24–25	1,800	1.012	689			
6–25–25	1,050	1.010	525			
6–26–24	1,200	1.014	608		5.71	

drawn before the breakfast ushering in a new period and all determinations are reported as milligrams in 100 cc.

The uric acid in the urine was determined by a slight modification of Benedict's and Franke's (15) method. The solutions are made up to 100 cc. instead of 50 cc. and only 4 cc. of sodium cyanide are used whereas the original method calls for 5 cc. The uric acid is reported in total milligrams excreted daily.

At the time the patient returned, April 6, he was still taking atophan and potassium bicarbonate three days and omitting it two days. The

medication was not interfered with during Periods I, II, III, IV, V, VI, VIII and period XI but both atophan and potassium bicarbonate were discontinued in periods VII, IX, and X.

Periods I and II. The period from April 6 to 14 inclusive must be discounted as inaccurate because the uric acid standard had deteriorated.

TABLE 4

Purine-free diet

FOOD	WEIGHT	PROTEIN	FAT	CARBOHYDRATE	PURINE	BASE	ACID
	grams	*grams*	*grams*	*grams*	*grams*	*grams*	*grams*
Orange	120	1.0	0.2	13.9	0	5.6	0
Ralston's	120	1.9	0.2	12.8	0	?	?
Cream	120	3.0	22.2	5.4	0	0	0
Butter	16	0.2	13.6	.....	0	0	0
Toast	60	5.6	0.7	13.6	0	0	1.8
Fried egg	50	6.7	5.3	.....	0	0	5.5
Milk, ½ cream	140	4.1	15.5	6.7	0	1.7	0
Mashed potato	100	2.2	0.9	18.4	0.02	7.19	0
Cheese	20	5.8	6.2	0.1	0	?	?
Bread	30	2.8	0.4	15.8	0	0	0.9
Butter	16	0.2	13.6	.....	0	0	0
Corn	100	2.8	1.2	10.0	0	0	2.0
Beets	100	1.6	0.1	9.7	0	10.9	0
Ice cream	100	2.3	9.2	14.6	0	?	?
Milk	140	4.6	5.0	7.0	0	1.66	0
Potato soup	60	1.5	1.7	4.6	0.01	2.2	0
Beet, tomato	100	1.2	3.6	4.0	0	?	?
Bread	60	5.6	0.7	30.6	0	?	1.8
Butter	16	0.2	13.6	.....	0	0	0
Cottage cheese	60	12.5	16.0	2.6	0	?	?
Mayonnaise	20	0.2	17.0	.....	0	0	0
Lettuce		Left					
Sponge cake	30	2.8	2.1	18.5	0	?	?
Whipped cream	27	0.3	5.4	0.4	0	0	0
Milk, ½ cream	140	4.1	15.5	6.7	0	1.7	0
		72.8	155.4	222.4	0.03	30.8	12.0

Total calories, 2,579.

The blood and urine findings have been recalculated to the new standard but they do not fall within the range of later results obtained with entirely new reagents. A new standard was again made in June and the results of the last period recalculated to it. Considerable trouble was also caused by the crystallization of the uric acid in the urine, but by

heating the urine a short time it was possible to redissolve the crystals and the determinations were made.

Periods III and IV. April 23 to 27, inclusive, the patient was given a diet that contained approximately 1.4 grams vegetable purine daily. The blood uric acid at the beginning of the period was 6.92 mgm. and at

TABLE 5

Vegetable purine diet

FOOD	WEIGHT	PROTEIN	FAT	CARBOHYDRATE	PURINE	BASE	ACID
	grams	*grams*	*grams*	*grams*	*grams*	*grams*	*grams*
Orange	120	1.0	0.2	13.9	0	5.6	0
Oatmeal	120	2.1	0.9	8.6	0.11	0	2.5
Cream	80	2.0	14.8	3.6	0	0	0
Milk, ½ cream	140	4.1	15.5	6.7	0	1.7	0
Toast	45	4.2	0.5	22.7	0	0	0.9
Butter	16	0.2	13.6	.....	0	0	0
Egg	50	6.7	6.3	.....	0	0	5.5
Mashed potato	100	2.2	0.9	18.4	0.02	8.2	0
Lima beans	100	4.0	0.3	14.6	0.63	13.9	0
Asparagus	100	1.5	0.1	2.8	0.21	0.8	0
Mayonnaise	20	0.2	17.0	.....	0	0	0
Bread	30	2.8	0.4	15.8	0	0	0.9
Butter	24	0.2	20.4	.....	0	0	0
Baked apple	120	1.0	0.2	13.9	0	4.5	0
Whipped cream	27	0.3	5.4	0.4	0	0	0
Radishes	20	0.3	0.2	1.2	0	0.6	0
Milk, ½ cream	140	4.1	15.5	6.7	0	1.7	0
Pea soup	100	3.6	0.2	9.8	0.39	3.0	0
	100	3.3	3.5	5.0	0.00	2.4	0
Creamed onions	151	3.4	3.1	17.3	0.11	1.4	1.4
Toast	68	5.6	7.3	23.7	0	0	1.8
Cheese sandwich	20	5.7	7.2	0.1	0	?	?
Celery	50	0.6	0.1	1.7	0	2.7	0
Peaches	100	0.7	0.1	10.8	0	5.0	0
Cookie	24	0.7	1.9	7.6	0	?	?
Crackers	20	2.1	2.5	11.7	0	0	1.6
		62.5	137.1	217.0	1.47	50.4	14.4

Total calories, 2,351.

the end it was 9.09 mgm. At the end of the purine-free period which followed the blood uric acid was reduced to 6.66 mgm.

Periods V and VI. For comparison meat purines were substituted for vegetable purine in one period. In a diet containing purine-free vegetables, 100 grams of beefsteak daily furnished the purines. The per cent

of purine in beef ranges from 1.3 to 2 grams in 100 grams (10), it was calculated at 1.5 grams to 100. After four days of this diet the patient's blood uric acid rose from 6.66 to 8.32 mgm. This increase, however, did not exceed the increase caused by 1.4 grams vegetable purine. A purine-free diet was given again with a resultant drop in the blood uric acid of 1.08 mgm.

TABLE 6

Meat purine diet

FOOD	WEIGHT	PROTEIN	FAT	CARBOHYDRATES	PURINE	BASE	ACID
	grams	*grams*	*grams*	*grams*	*grams*	*grams*	*grams*
Grapefruit	70	.....	.....	4.2	0	?	?
Malt	120	1.5	0.2	10.7	0	?	?
Toast	50	4.2	0.5	23.7	0	0	1.4
Butter	16	0.2	13.6	.....	0	0	0
Poached egg	50	6.7	5.3	.....	0	0	5.5
Milk, ½ cream	140	4.1	15.5	6.7	0	1.7	0
Cream	100	2.5	18.0	4.5	0	0	0
Mashed potato	100	2.2	0.9	18.4	0.02	7.2	0
T-bone steak	100	21.9	20.4	.....	1.50	0	13.9
Carrots	100	1.1	0.4	9.3	0	7.1	0
Orange	60	0.5	0.1	7.0	0	3.4	0
Grapefruit	70	...	.....	4.2	0	?	?
Dressing	20	0.2	5.0	2.5	0	0	0
Bread	30	2.8	0.4	15.8	0	0	0.9
Butter	24	0.2	20.4	.....	0	0	0
Pineapple	80	0.3	0.6	29.1	0	?	?
Cabbage	100	1.6	0.3	5.6	0	4.3	0
in milk	100	3.3	3.5	5.0	0	2.4	0
Rice	100	1.6	0.5	15.8	0	0	1.6
Tomato	100	1.2	3.6	4.0	0	?	?
Butter	24	0.2	20.4	.....	0	0	0
Bread	30	2.8	0.4	15.8	0	0	0.9
Baked apple	105	0.4	0.5	23.7	0	3.8	0
Cookie	24	0.8	1.9	7.6	0	?	?
Radishes	20	0.3	0	1.2	0	0.6	0
Milk	140	4.6	5.0	7.0	0	3.3	0
		65.1	137.3	221.8	1.52	33.7	24.2

Total calories, 2,384.

Periods VII and VIII. The vegetable purine period was next repeated omitting atophan and potassium bicarbonate so that results unobscured by them might be obtained. The purine-free diet preceding this period continued two days without atophan to allow the effect of

the drugs to wear away. Vegetable purine amounting to 1.46 grams daily was given. At the beginning of the period the blood uric acid was 7.28 mgm. and after the completion of the period it had risen to 9.3 mgm. A purine-free diet and atophan was then given to reduce the blood uric acid before the patient left for vacation. The patient left May 26 with blood uric acid of 8.24 mgm.

Periods IX and X. The patient returned June 7, with a blood uric acid of 9.57 mgm. and was given a purine-free diet without atophan. The uric acid in the blood dropped only 0.5 mgm. in 100 cc. in the four days. A diet carrying 1.5 gram of vegetable purine was served for four days, still omitting the atophan. At this point unusual results were obtained, for when the blood was tested it contained 0.5 mgm. less uric acid than it had at the beginning of the period instead of the increase that had followed similar periods. The urinary output for these two periods was much lower than during the earlier periods, the uric acid seemingly piled up in the system and then there was a very high excretion the day before the blood uric acid was determined.

Period XI. The patient was asked to take atophan again and was given a purine-free diet for the remainder of the time. After five days on the diet the blood uric acid was reduced to 6.66 mgm. and three days later when the patient was discharged it was 5.71 mgm.

The excretion of uric acid varies so widely from day to day that little information can be gained from the findings. The average excretion for each period was calculated. In all cases the addition of purine caused a rise in the excretion of uric acid, a result similar to that obtained by Mendel and Wardell (9) with coffee. The excretion of uric acid during a purine-free period was sometimes greater and at times less than during the purine containing period just preceding, but this variation was never greater than 20 mgm. The purine-free periods were not long enough to bring the uric acid in the blood to its lowest level. For that reason the trend of both the blood uric acid and the excreted uric acid is toward a higher level.

Tables 1, 2, and 3 give the daily volume of urine, specific gravity, total uric acid excreted, the period average for excreted uric acid, and blood determinations for each period. The graph shows in simpler form the relation between the diet and blood uric acid.

SUMMARY

1. One patient with gout was studied over a period of sixty-days.
2. Diets containing 1.4 to 1.5 grams of vegetable purine were compared

with diets containing an equal amount of meat purine. Each period was separated from the next by a purine free period. Periods were four to five days each.

3. It was necessary to give a serving each of peas, beans, oatmeal or onions, and asparagus daily to give the amount of purine equivalent to that in 100 grams of beefsteak.

4. Uric acid determinations were made on the blood between periods and on the urine daily.

5. Periods when atophan was given were compared to those when it was omitted.

6. Results: *a.* Vegetable purine caused an increase in the blood uric acid equal to that of a similar quantity of meat purine.

b. Excretion of uric acid was increased by vegetable purines as well as by meat purines.

c. The elimination of uric acid was delayed so that the excretion remained high during the following purine free period.

d. In this patient atophan and purine poor diets supplement each other: for when on a high purine diet the blood uric acid rose in spite of the atophan, and a purine-free diet without atophan failed to reduce it.

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EDITORIAL

Editor's Note

The material for this issue of the Journal of the American Dietetic Association was compiled and edited by Dr. Ruth Wheeler. This work was done in the University of Iowa Hospitals. Dr. Wheeler has suggested that at least one issue of the Journal each year be given over to a group of workers as a special number. This seems an admirable plan. We hope that other organizations will be ambitious to follow the example of the Department of Nutrition of the University of Iowa Hospitals.

F. H. S.

Editorial

The department of nutrition of the university hospitals at the State University of Iowa is completing its fifth year. The department is responsible for the feeding of 450 to 500 patients and about 200 others in the main hospital and its annexes, some 225 patients and 75 other people in the childrens hospital, about 150 nurses in each of two nurses homes, and for teaching student nurses dietetics in class and in the diet kitchen. The department works with the superintendent and any of the services on special problems, either administrative or therapeutic, connected with hospital feeding. At present the organization is this: a department head or chairman, in the main hospital an administrative dietitian, a therapeutic dietitian, a ward dietitian, and a childrens' dietitian; in the childrens' hospital, a chief dietitian, an administrative assistant and a pediatrics dietitian who is more or less separate from the others; altogether about 1 dietitian for 95 patients or 1 for 160 persons fed, counting half the time of the department head. The head of the department is also professor of nutrition in the medical faculty and is expected to act in that capacity as a consultant to all services, to give lectures on dietotherapy to medical students as a part of their course in therapeutics, and to give graduate courses in nutrition.

Twelve months professional training in nutrition is given to 6 interns, nominated by the head of the department, endorsed by the superintendent and the medical faculty as are other internes. They are all holders of a bachelor's degree in physical and biological sciences and

foods and nutrition; they have nearly all had one or two years experience as hospital dietitians, managers of cafeterias or teachers of foods or dietetics. They carry increasing responsibility in all phases of the work and each one undertakes some special problem. Some of the studies are reported in this issue.

The present head of the department leaves at the end of this academic year to go to Vassar as professor of physiology and nutrition with a temporary visiting professorship in a New York City institution to help in the development of another hospital department of nutrition. The State University of Iowa plans to make another pioneer contribution to the cause in the next phase of the growth of the department here. The head will be an administrative rather than a therapeutic dietitian;[1] the department of the theory and practice of medicine will have on its staff a professor of nutrition[2] who will act as a consultant to all services and direct the therapeutic side of the interns' work. This type of organization was considered 5 or 6 years ago but it was decided that the type adopted was best for the early years at least.

The American Dietetic Association should rejoice that these two demonstrations are being made. There is danger as well as advantage in standardization. Hospital dietary departments are still a long way from a stage of growth that makes ossification an advantage. Some things seem very important for optimum functioning; others are more or less interchangeable. For one thing, if besides the administration, individual therapeutic work with patients is to be done, 1 dietitian for 100 patients is a wise low ration though there are many places where excellent work is being done with a far lower ratio and one would not hesitate to undertake it under good conditions of coöperation. In the second place, for optimum functioning, most general hospitals need an administrative and a therapeutic dietitian; if both women have training along both lines so much the better, but for the best results the people doing the detailed work should have attention focused on one or the other phase. Which person is chairman of the department, in the opinion of the writer, is not very important. The head must in any case have a keen and generous appreciation of the importance of the specialty which is not hers; she must be most generous in backing the therapeutic dietitian if she is an administrator, and in backing the administrator if she is a therapeutic dietitian. The advantages of either sort of head are rather obvious:

[1] Florence Ross, formerly of Simmons College.
[2] Kate Daum, formerly research dietitian, S. U. I.

an administrative dietitian as chairman will most easily gain the confidence of the superintendent; the therapeutic dietitian will most easily gain the confidence of the heads of services. Neither is likely to be altogether conscious of the disadvantages of her own type of organization. Neither can really succeed as one resembling an absolute monarch. The best chairman in such positions succeeds by real delegation of authority, real generosity and respect toward her colleagues in her own and other departments of the institution. She must also have clear vision and a modest realization of her own limitations. She must strive unceasingly to keep the emphasis on things to be accomplished and not on people and their motives (which can seldom be known with any accuracy) frequently recalling the undoubted fact that the other fellow's opinion may be as good as one's own, or better, even when it looks most vicious. She must be able to see a crisis coming and stop it before it arrives.

The problem is an exceedingly complicated one. The department is the servant not only of the patients but of all its colleagues. It can serve them best in institutions in which the superintendent recognizes that to serve the clinical and scientific departments, dietitians must have an opportunity to grow scientifically in their daily work, and in which the clinical and scientific people realize that the amount contributed by the dietitian must be regulated by the administration.

RUTH WHEELER.

CURRENT LITERATURE

Hospital Management:

January, 1926.

P. 30. Recent progress in hospital dietetics. Mary de Garmo Bryan.

P. 78. Hospital dietetics takes big step. Sister Camilla Cenna.

P. 78. Food kitchen equipment.

February, 1926.

P. 42. As a superintendent sees the dietitian. E. S. Gilmore.

P. 46. Thirty-three months of electrical cooking. J. G. Johnson.

March, 1926.

P. 27. A method of feeding employees. Margaret Gillam.

P. 38. How to make and use a budget. Charles E. Rice.

Modern Hospital:

January, 1926.

P. 6. Tendencies in hospital planning and construction. S. S. Goldwater, M.D.

P. 43. What the dietitian has done and will do. Rena S. Eckman.

P. 80. Advantages and disadvantages of the three types of dietary departments. Ruth Wheeler, Ph.D.

P. 84. Some ways to relieve the monotony of the liquid diet. Lulu G. Graves.

February, 1926.

P. 157. Kitchen and food equipment at James Whitcomb Riley Hospital.

P. 167. The metabolic department of Philadelphia General Hospital.

P. 168. Promoting coöperation between the nursing and dietetic departments. Charlotte Addison.

P. 176. The consultants rôle in the field of dietetics. Fairfax Proudfit.

March, 1926.

P. 228. Planning for refrigeration. Frank Sutton.

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Water metabolism. Edmund Andrews, M.D.

February, 1926.

P. 153. Relation of albuminuria to protein requirement in nephritis. John P. Peters, M.D., and Howard A. Bulger, M.D., Carter Lee, Celia F. Murphy.

Journal of Biological Chemistry:

January, 1926.

P. 43. Iron in nutrition. C. A. Elvelyein and E. B. Hart.

P. 101. The effect of high protein diets on the kidneys of rats. Henry Jackson, Jr., Margaret D. Riggs.

February, 1926.

P. 371. Dietary factors influencing calcium assimilation. E. B. Hart, H. Steenbach, C. A. Elvelyein, H. Scott, G. C. Humphrey.

P. 385. Further observations on the fate of acid in the body. Cyrus H. Fiske, Robt. A. Goodell, Louis D. Hathaway, Jr., Edward J. West.

P. 413. The antirachitic value of irradiated cholesterol and phytosterol. Alfred F. Hess, Mildred Weinstock, Elizabeth Sherman.

P. 491. The basal metabolism of girls. Katherine Blunt, Jennie Tibb, Laura McLaughlin, Katharine B. Gunn.

American Journal of Public Health:

February, 1926.

P. 109. The vitamin content of foodstuff. Walter H. Eddy.

P. 142. The chlorine treatment of oysters. Charles Krumuride, M.D., William H. Park, M.D.

British Journal of Experimental Pathology:

February, 1926.

P. 22. Insulin and glucose utilization. C. G. Sambie.

American Journal of Physiology:

February, 1926.

P. 542. The influence of testes on metabolism. E. P. Bugbee, A. Simond.

P. 618. Cholesterol and phosphatide metabolism in pregnancy. Emil J. Bauman, O. M. Holly.

P. 645. Studies in nutrition of white mouse. I. The normal growth and nutritive requirements. Howard H. Beard.

P. 658. II. Effect of feeding diets rich in protein and diets containing unbalanced salt mixtures. The rôle of certain sulfur components. Howard H. Beard.

P. 668. III. Vitamin factors in the nutrition of mice. Howard H. Beard.

P. 682. IV. Relation between diet and reproduction. Howard H. Beard.

P. 696. Mineral metabolism studies with dairy cattle. H. G. Miller, W. W. Yates, R. C. Jones, P. M. Brandt.

American Journal of Diseases of Children:

January, 1926.

P. 1. Dried human milk. V. Its use in the feeding of premature infants. Paul W. Emerson, M.D., Lawrence W. Smith, M.D.

P. 41. Variations in the antiscorbutic properties of dry milk. A. C. Supplee, Ph.D., Odessa D. Dow, M.S.

February, 1926.

P. 169. Fasting as a cause of convulsions. Hugh Josephs, M.D.

P. 228. The basal metabolism after pneumonia. Bela Schick, M.D., Philip Cohen, M.D., Isabelle Beck, M.D.

P. 235. Trypsin secretion of infants with special reference to rickets. T. Tukacs, M.D.

March, 1926.

P. 363. Insulin in malnutrition. Louis Fischer, M.D., Julian L. Rogaty, M.D.

P. 380. Recurrent rickets. Alfred F. Hess.

P. 386. Value of nutrition classes to the undernourished child. Albert D. Kaiser, M.D., Herman J. Nortion, Edith M. Walker.

P. 395. Progress in pediatrics: Acidified milks. Harold K. Faber, M.D.

Public Health Reports:

February 5, 1926.

P. 1. Some nutrition experiments with brewer's yeast. Maurice I. Smith, E. G. Hendrick.

February 19, 1926.

P. 1. A further study of butter, fresh beef, and yeast as pellagra preventives. Joseph Goldberger, G. A. Wheeler, R. D. Tillie, L. M. Rogers.

Hygeia:

January, 1926.

P. 16. I reduce.

March, 1926.

P. 133. Duping the diabetic. Arthur J. Cramp.

P. 147. Safe reducing feats. W. D. Sansum.

Journal of the American Medical Association:

January 9, 1926.

P. 104. A case of infantile diabetes treated with insulin. Harold M. Bowcock, M.D., James A. Wood, M.D.

P. 109. An outbreak of food poisoning probably due to "rat virus." Robb Spalding Spray, Ph.D.

January 16, 1926.

P. 178. High carbohydrate diets in diabetes mellitus. W. D. Sansum, M.D., N. R. Blatherwick, Ph.D., Ruth Bowden, B. S.

P. 200. The rôle of insulin in carbohydrate metabolism.

January 23, 1926.

P. 267. Gastric acidity in syphilitic children. Maurice Dorne, M.D., W. H. Brams, M.D., I. Harrison Tumpeer, M.D.

January 30, 1926.

P. 319. Seasickness. P. H. Desnoes, M.D.

P. 350. Crystalline insulin.

P. 352. Dried human milk.

February 6, 1926.

P. 418. A nutritional outlook.

February 13, 1926.

P. 482. The frequency of botulism.

February 20, 1926.

P. 535. The association between diabetes mellitus and chronic infectious arthritis. Earl Schmitt, M.D., S. Franklin Adams, M.D.

P. 554. Diabetic lipemia retinalis and fat embolism. Clarence F. Bantin, M.D., p. 546. Heredity and obesity.

February 27, 1926.

P. 609. Trichinosis, William L. Bettison, M.D.

P. 628. Glucose as a food.

March 6, 1926.

P. 677. The rôle of dentition in the diagnosis of rickets. Julius Blum, M.D., Jacob Mellion, M.D.

March 13, 1926.

P. 737. Intestinal intolerance for carbohydrate associated with overgrowth of the gas bacillus. A. I. Kendall, Jr., Ph.D.

P. 752. Chloride in diabetic acidosis.

P. 753. The structure of proteins and living tissues.

P. 754. Marasmus and protein hypersensitiveness.

March 20, 1926.

P. 870. The effect of ultraviolet rays on milk and eggs.

P. 872. Sunshine and skyskine.

P. 873. Orange juice as a nutrient.

P. 873. Metabolism of marantic infants.

BOOK REVIEW

YOUR FOODS AND YOU OR THE RÔLE OF DIET. By Ida C. Bailey Allen. Illustrated by Edward M. Stevenson. (Doubleday, Page & Company, 1926.) $1.50.

This book, attractively put up, catchingly written, and cleverly illustrated, bids fair to have a wide circulation. It is written by a "dietitian" who has put her material in a form readily usable. The information given includes directions for food selection and preparation, many recipes, and specific instruction on what to give in cases of malnutrition, obesity, diabetes, rheumatism, and gastric disorders—ad infinitum. In addition the author gives delightful bits on what to eat when angry, worried, bilious, tired, or grief-stricken. All of them would be decidedly valuable, if they were accurate. In the preface we are informed that Mrs. Allen will give us the "latest" on vitamins, but she does not mention E, and calls A the anti-rachitic. We are informed that the cook must be happy—as her nature is reflected in the food (page 13); that anger generates poisons; and that we should eat bulky foods— to help carry away the toxins of grief! In the chapter on diabetes we are told that the patient should memorize what he should not eat, and that only 5 per cent vegetables are allowable. The menus are useless and in them fat is avoided as it was commonly done 10 years ago. Nephritics are allowed no pears, pineapples, melons, or tomatoes; and the diets for typhoid and gastric ulcer patients are based on days and weeks instead of on the condition of the patient. We wonder what her idea of anemia is when she says, "If there is anemia certain fats, starches and sweets may be used until weight has been gained" (page 90); and that people who eat large quantities of over-cooked foods become anemic (page 7).

Even children do not escape, as she allows them no orange juice until the age of 3 months, when they may have a few drops.

It is extremely unfortunate that Mrs. Allen, who has a nation-wide reputation, should allow herself to put out a book which contains no references and is filled with inaccuracy. Although it offers many useful suggestions, these do not compensate for the harm that may be done by its inaccuracies and misstatements.

E. J. M.

ASSOCIATION NEWS

THE CONVENTION

The ninth Annual Meeting of the American Dietetic Association will be held at the Ambassador, Atlantic City, New Jersey, October 11, 12 and 13. Plans are well under way for an interesting program and exhibit and a general good time. The hotel and railroad rates afford a splendid opportunity for a vacation at a very reasonable cost. The hotel rates, unusual for Atlantic City, are as follows:

Large outside rooms, each with twin beds and private bath for 2 persons, $8 and $10; for 1 person, $5, $6, and $7.

With Kate Daum as Chairman of the Program Committee and with New York, Philadelphia, Baltimore and Washington from which to draw a large number of our speakers, we are assured of an unusual program.

Helen Gilson of Pennsylvania Hospital, Philadelphia, as Chairman of Local Arrangements and Alice McCollister of New York, as Local Representative of exhibits, are doing much to make the Convention a success. Sara Hickcox of New York is to have charge of the non-commercial exhibit.

Professional and other trips are being arranged in the cities near, by Louise Keegan of the New York Polyclinic Hospital, New York City, Janet Ward of the Hahnemann Hospital, Philadelphia, and Grace S. Hunter of the Walter Reed Hospital, Washington, D. C. Special trips to places of interest can be arranged by communication with the office.

Plan now to attend the Convention.

NEWS NOTES

Genevieve Field Long has given up her work as Chief Dietitian at Walter Reed General Hospital, Washington, D. C., and will spend several years in Rio de Janeiro, Brazil. She is succeeded by Grace H. Hunter, a former assistant. Miss Hunter writes that the District of Columbia Dietetic Association is active and now has twenty-five members.

The present officers of the Quebec Dietetic Association are as follows:

President: Vera Sparling, Y. W. C. A. Cafeteria, Montreal.

Vice-President: Phyllis Clark, Sun Life Insurance Co., Montreal.

Secretary-Treasurer: Edith Hunter, High School Cafeteria, Montreal.

Alice L. Edwards has left Rhode Island State College to take the position of Executive Secretary of the American Home Economics Association, Washington, D. C.

Dorothy M. Stephens is now at the New Post Graduate Hospital, New York City.

Word has been received from Frances MacKinnon, formerly a student at Presbyterian Hospital, New York City, that she has accepted a position with the American Red Cross, Weld County Chapter, Greeley, Colorado.

After a long silence Frances Saville, Mineville, New York, writes that she is recovering from a long illness, due to her war service.

It is hoped that she will soon be able to resume active work.

Lena C. Clarke is now at the Greenwich Hospital, Greenwich, Connecticut.

Luella K. Fauble has left the Infant Welfare Society of Chicago, and has gone to Decatur, where she is part owner of a Cafeteria.

Dorothy Phillips of Corbettsville, New York, has been ill in a hospital this winter.

Ruth O. Reineke, formerly of Aberdeen, South Dakota, is now Dietitian at the Good Samaritan Hospital, Cincinnati, Ohio.

Rosalie Godfrey, formerly of the Office of Home Economics, Washington, D. C., is attending the University of Washington, having received a fellowship in Nutrition for this year.

Miss Katharine Mitchell, formerly therapeutic dietitian, University Hospital, Iowa City, has accepted the position of Chief Dietitian at Michael Reese Hospital, Chicago, Illinois.

Amy M. Fackt of Simmons College has spent the winter quarter studying at the University of Chicago.

Ouanita Geffert is now at the Terrace Springs Sanitarium, Richmond, Virginia.

Clara E. Henry writes that she is at the New York Hospital, New York City.

Frances Dunning, is now at the University Far, St. Paul, Minnesota.

Helen A. Drisko, formerly of Boston, has accepted a position at the Eastern Maine General Hospital, Bangor, Maine.

A letter from Miss Ruth Pelton tells us that she is at the Allegheny Hospital, Cumberland, Maryland.

Dorothy Tower writes from Tokyo that she will return to America about the first of June.

The Minnesota Association of Hospital Dietitians held its February meeting on the eighth, at 3:30 p.m., at Millard Hall, University of Minnesota. The program was as follows:

Business Meeting.
"Hospital Equipment." Representative from the Joesting and Schilling Co., St. Paul Minnesota.
"Hospital Equipment from the Dietitians Viewpoint." Gladys McDonald, St. Luke's Hospital, St. Paul, Minnesota.
Round Table.

The March meeting was held on March eighth, in Millard Hall.

Business Meeting.
"The Psychology of Good Service." Dr. R. S. Ahrens. This was indeed interesting and very much enjoyed by all.
"Cost of Extra Food for Trays. Selective Service," Lillian Lundquist, Eitel Hospital, Minneapolis, Minnesota.
Discussion. Helen Kunz, Northwestern Hospital, Minneapolis.
Survey of Selective Food Service in various Hospitals. Ellen Satre, St. Lukes' Hospital, St. Paul, Minnesota.
General Discussion on large quantity recipes. Each member brought two recipes that she had found satisfactory.

In April the meeting was held at St. Mary's Hospital, Minneapolis.

Business Meeting.
"Nephritis and Nephrosis." Dr. Wm. A. O'Brien.
"Diets for Nephritis and Nephrosis." G. I. Thomas.
"Nephritis and Nephrosis." Dr. Peppard, Consultant, Minneapolis General Hospital.

The New York Association of Dietitians met at the Russell Sage Foundation Building, on February eighth. The subject of the meeting was "The Educational Value of Social Service." The speakers were Miss Lucy Gillett, Director of Nutrition, A. I. C. P., Miss Bertha Edwards, Supervisor of Nutrition, East Harlem Nursing and Health Demonstration, Miss Frances Benjamin, Supervisor of Educational Work, East

Harlem Nursing and Health Demonstration, Dr. George Baerhr, Director of Metabolic Clinic, Mt. Sinai Hospital. Dr. Emily C. Seaman was in charge of the meeting.

The fifth meeting of the Southern Section of the California State Dietetics Association was held in the Anita Baldwin Clinic, 1401 South Grand Avenue, on Monday evening, March first, at eight-thirty. Dr. E. Moore, pathologist, who was to address us on some of his recent laboratory results, was unable to be present, so the meeting proceeded with the discussion of the "Relation of the Dietitian to (1) The Medical Profession, by Mrs. Cooke of the Chase Sanitarium, (2) The Nursing Profession, by Miss Hart of the Good Samaritan Hospital, (3) The Patient, by Mr. Moore of the Glendale Sanitarium, (4) The Hospital, by Miss Anderson of the Methodist Hospital."

Dr. Thompson, of the U. of C. Southern Branch, reviewed several recent reports for us: (1) The Bacterial Count of Washed vs. Unwashed Lettuce; (2) The viability of Typhoid in Oysters.

MARRIAGES

Zoe Harris to M. D. Orten. Present address, Rolla, Mo.

Carrie M. Luce to W. Merle Webster. Present address, 44 Liberty St., Warsaw, N. Y.

Anita Feld to Sidney J. Silbar. Present address, 251 24th Street, Milwaukee, Wis.

Mable Root is now Mrs. Williams of Portland, Oregon (Campbell Hill Hotel).

Edith Nonken is now Mrs. Cross of Kansas City, Mo. (2400 Benton Blvd.).